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ABSTRACT

Aimed at decision makers who will choose whether and how to implement telecommunications efforts in the human services, this final evaluation report describes an intensive demonstration effort, which was conducted by the Alternate Media Center of New York University from July 1979 to September 1980 to show how various telecommunications media, including teleconferencing and microcomputers, might benefit developmentally disabled children and adults. Most of the applications described were focused in rural Vermont, although two involved participants in other states. Discussions of activities in Vermont using audio conferencing, personal computers, and computer conferencing, include a description of Vermont Telecommunications Incorporated, which was created after the completion of the project to promote telecommunications technology for the developmentally disabled and those with other handicapping conditions. A section on national activities describes an electronic mail network and several telecommunications consultation projects. Overall project conclusions and policy recommendations for human service funding agencies conclude the report. Eight appendices include data collection instruments and specific data collection results. (LMM)

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Telecommunications and Developmentally Disabled People:

Evaluations of
Audio Conferencing
Personal Computers
Computer Conferencing
Electronic Mail

by

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July 1981
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SUMMARY

Telecommunications can make a difference in the lives of developmentally disabled people. As the results of the intensive demonstration effort reported here make clear, however, these media do not provide simple solutions for the problems of the developmental disabilities world.

The demonstrations reveal a gradual process of testing and fitting, trial and error. When the fit was nurtured carefully, telecommunciations emerged as a practical and valuable tool. Where the fit was not considered carefully, or was not quite right, the demonstration lost its vigor. There are lessons here for decision makers and implementers alike.

The results of the demonstration to date can be summarized in two words--modest success. Most of the applications were successful, but some were more so than others. Only one application was clearly unsuccessful.

From July 1979 to September 1980, the Alternate Media Center (AMC) conducted this major demonstration to show how various telecommunications media might benefit developmentally disabled (DD) children and adults. Most of the applications were focused in rural Vermont, although two involved participants in other states. AMC began with a belief that such media would have to meet three criteria if they were to be of practical assistance to DD people: They would have to prove effective, affordable, and accessible.

However effectiveness is defined, the minimum requirement is that use of telecommunications should be closely tied to the needs of DD people and those who serve them. To be affordable, the use of telecommunications must be within the financial means of the users. To be accessible, the opportunity for use must be well within the reach of potential users. This document is a final evaluation report on the demonstration, beginning from those three general criteria.

Understanding the organizational style of AMC is key to understanding what happened in the demonstration. AMC began with an attempt to understand the needs of the DD community, without specific notions of which technologies would be used in the demonstration. AMC's style is unabashedly intuitive. It places heavy stress on users themselves deciding what sort of system they would have, on users making the demonstration happen. In a real sense, our attempt to describe the AMC style is an after-the-fact attempt to impose a logic upon a basically intuitive process. The evaluation approach has attempted to take the AMC style into account, to provide practical results without freezing the obvious vigor of the demonstration evaluated.

For most user groups, the demonstration was definitely effective. Of course, the specifics of what constituted "effectiveness" for each group varied considerably. And effectiveness was difficult to measure precisely, even when users were sure it was there.

The technologies employed were down-to-earth affordable. The audio conferencing equipment built heavily on the existing telephone network, minimizing the need for costly new technologies. The computer-based demonstration was more expensive, but still in a modest cost range that should continue to decrease as computer costs decline. For all the applications, the personnel costs for organizing and supporting the effort were much higher than the cost of the equipment.

One of the primary reasons AMC selected the telephone network as a starting point was its ubiquity. Telephones are almost everywhere, of course, even in rural Vermont. The quality of service certainly varies, but the basic access is good. The applications involving computers, however, were less accessible. There are also broader issues of accessibility, moving beyond whether a system is technically accessible to whether it is perceived as accessible by potential user groups. The latter point is more difficult to assess, but is at least as important. The perceived accessibility seemed quite high, but there were exceptions.

The findings reported here result from analysis of interviews and questionnaires with users, from audio tapes, from computer transcripts, usage data, and cost figures. We present qualitative as well as quantitative information, with more of the former than the latter. In short, these were demonstrations with more emphasis on making them work than on making them measurable.

Audio conferencing (telephone conferencing) was selected as an appropriate technology for the expressed needs of the Vermont people and the financial constraints of the time. Over a dozen consumer, educational, and service groups were involved; they used the various conferencing systems about 14 hours per month from November 1979 to December 1980. The reactions of users were mostly positive, as were the apparent impacts on their organizations. There was considerable variation from group to group as to how they used audio conferencing, but we identified three usage styles: the presentation, the informal discussion, and the structured discussion. All three styles were well represented during the demonstration period.

The audio "bridge" that was implemented during the project currently connects as many as 14 different locations via special phone numbers (toll free in Vermont), allowing participants to talk together as a group. The operation of the bridge has been taken over by a local nonprofit organization set up for the purpose. While there is still some uncertainty about its future, it is now providing high quality, dependable, and economical service.

Personal computers were used during the project by eight adolescents and adults, each of whom had some physical impairment due to cerebral palsy. The computers, some of which were adapted to accommodate specific physical handicaps, were used for eduational, vocational, and communications purposes. It was a very small group and participants varied widely, but the demonstration resulted in many hopeful outcomes in the lives of the users. The continuation of this activity has been assured up to September 1982 with support and day-to-day management by a local advocacy group.

Computer conferencing, a medium for group communication through typewriter-like computer terminals, was demonstrated as a means of linking staff at institutions for the developmentally disabled. Resource persons at university centers were also involved in this application. The group itself never achieved much momentum, and no topical focus emerged. The demonstration triggered interest among participants in how such a medium might be used in the future, but few examples emerged of how it could actually be used in the present. It appeared that, while senior administrators thought it would be very useful, the ultimate users never became committed to the concept.

Electronic mail, a person-to-person medium similar to computer conferencing, was demonstrated much more successfully as a link among University Affiliated Programs (UAPs) for the developmentally disabled at universities all around the United States. The speed of exchange and the low cost were high points of this application, which is now being expanded with ongoing support provided by user organizations themselves.

This report ends with overall project conclusions and policy recommendations for human-service funding agencies. This presentation is geared toward those decision makers who will make the choices as to whether and how to implement telecommunications efforts in the human services.

The results of this demonstration are very promising, but they also demonstrate the importance of careful organization. Telecommunications does not "solve" anything, although these media do provide valuable tools for persons in the DD world. The demonstrations reported here are important case studies for future efforts; they are sources of both hope and humility.

ACKNOWLEDGMENTS

This was a project with many participants and much to do. The Institute's role was evaluation and dissemination, two functions we had never before combined in a project of this sort. In retrospect, the combination was a very good one. In order to evaluate what was going on, obviously, we had to know what was going on. But knowing what is going on when a fast-paced group like AMC is in charge is no easy task. Our dissemination role required that we watch and listen, draft descriptions of what we thought was happening, and feed them back to those in the field for responses. Eventually, with many revisions, we reached a point of reasonable accuracy. We are very appreciative of the skills and patience of those people with whom we watched, described, and revised our views. In particular, Red Burns, Pat Quarles, Eileen Connell, and John Carey were our chief "targets;" they were at the center of the demonstration activities, and it was their efforts that we tried, not always successfully, to understand and report. Martin Elton provided an important bridge between our work and those in the field. Sensitive to the needs of both evaluation and organization, we found his role indispensable to our work.

The original vision of this project tracks back to the HEW Request for Proposals to which we responded. Both Doris Haar and Lita Colligan played important roles in developing the idea that led eventually to this project and this report. This original vision expressed in the Request for Proposals must be credited in large part to those two impressive people.

The Institute was one of three subcontractors on this project, and we would like to thank the other two groups for the assistance they provided. In particular, Lou Cooper and Phil Ziring from Roosevelt Hospital were of great help as we learned about the complexities of the DD field. Seldon Todd, Ann Cohen, and Jay Barr of the American Association of University Affiliated Programs were of particular assistance during the organization of the electronic mail application.

The user groups whose activities we tracked were, in a word, delightful. They were also impressive in both the work they did and the patience they showed in helping us understand their reactions to these strange new media. We are deeply grateful and hope we have captured in this report some of the excitement of these groups so that it can be shared with others. Steve Chupack of the Vermont DD Council and Wayne Fox of the Center for Developmental Disabilities admirably bore the brunt of our questioning. The group leaders were particularly helpful: Lu Christie, Karen Thomas, Gail Wickes, Chryss Jones, Lee Viets, Jim Schumacher, Gisela Wilson, Joan Lumbra, Andrea Blanche, Barry Bernstein, Earl Anderson, Paul Dorfner, and Fred Abraham. Our thanks go beyond what a simple listing here can convey. We are also particularly grateful to Mary Reilly of Vermont Telecommunications, Inc., for her help in keeping us up to date on the usage information for each group and the day-to-day activities involved in coordinating all of the applications and groups.

Here at the Insitute, this was not a hierarchically structured project. While I was the overall project leader, Barbara McNeal was in charge of the electronic mail application. She also organized and maintained most of our daily information about field activities in Vermont. She drafted a large portion of this report and closely followed both the consumer groups using audio conferencing and the personal computer users. Barbara was our most consistent presence in the varied aspects of this varied project, and she was a constant source of very strong efforts.

Mike Nyhan was charged with shepherding the dissemination side of our efforts, from the proposal almost three years ago to this final report. It was Mike's idea, for instance, that we have a volume of papers written by the users themselves, and we think this is the first such project to have a volume of that sort. He also followed very closely the activities of the I-Team and the DD Council, as well as constantly reminding us that this work should lead to results that can inform policy decisions.

During the project, we received very important editorial support from Carol Westburg until she left the Institute several months ago. James MaHood stepped in admirably as we struggled to make this final report both comprehensive and readable. We are also indebted to Ellen Margaret Silva for her innovative graphic design work that provides visual images of some of the concepts we sought to convey in this volume; and Alexis Makarevich for her persistent efforts in word processing through the various stages involved in preparing this document for publication.

Robert Johansen
Project Leader
June, 1981

INTRODUCTION

The project team sought to demonstrate and evaluate down-to-earth options for using telecommunications to benefit DD children and adults. AMC bypassed splashy one-shot demonstrations in search of applications that had a good chance to continue beyond the initial project funding. The resulting projects were technologically straightforward, but they emphasized organizational innovations.

The term "developmental disability"* covers an assortment of handicapping conditions. Developmentally disabled people, who often have multiple disabilities, are among the most severely handicapped. They require a wide range of generic and special services over an extended period--often for life. These services are provided by many agencies, specialists, and care-providers in homes, community settings, and institutions.

AMC's overall approach to the project has been

> to create and nurture processes whereby those organizations providing services to developmentally disabled people will learn whether and how to match telecommunication services to communication needs. . . .**

The objective was not just to demonstrate applications of telecommunications, but also to nurture processes for addressing both present and future communication needs in the developmental disabilities field. By "nurture," AMC meant creating processes that would help people in the DD field develop their own capabilities for using telecommunications appropriately without dependence on outside consultation.

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*The term itself is a legal rather than a medical one. Developmental disabilities are defined as severe, chronic disabilities attributable to mental or physical impairment that are manifested before age 22, result in substantial limitations in three areas of major life activity, and result in the need for services over an extended period (Developmental Disabilities Assistance and Bill of Rights Act 1978 as amended, U.S. Congress).

**"Telecommunications Applied to University Affiliated Programs: A Proposal to the Rehabilitation Services Administration Department of Health, Education, and Welfare, Washington, D.C.," by Alternate Media Center et al., August 15, 1978.

This project began October 1, 1978. It resulted from a July 1978 Request for Proposals (RFP) from the Rehabilitation Services Administration of the United States Department of Health and Human Services (formerly the Department of Health, Education and Welfare). After a national competition and review of proposals, a grant of $1.5 million was made to the Alternate Media Center (AMC) at New York University's School of the Arts. AMC assembled the project team made up of AMC and three subcontractors: The Institute for the Future was charged with evaluation and dissemination; the Pediatric Service of the Roosevelt Hospital (Department of Pediatrics of the College of Physicians and Surgeons of Columbia University), New York City; and the American Association of University Affiliated Programs in Developmental Disabilities (AAUAP), Washington, D.C. The latter two contributed special knowledge about the DD field to the project team.

Between October 1978 and June 1979, the team (AMC staff, with assistance from Institute staff) conducted a needs assessment that surveyed the communication needs of the developmental disabilities field. Forty-five regional seminars were conducted in locations across the country. Typically, the seminars were conducted at individual University Affiliated Programs (UAPs);* the participants included not only UAP staff, but also people from diverse groups in the field, such as state DD Councils, research and training centers, and mental retardation centers.

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*A University Affiliated Program (UAP) is an interdisciplinary university-based center for the training of DD professionals. UAPs also develop and demonstrate specialized services for the diagnosis and treatment of persons with developmental disabilities. There are 47 such centers located in 30 states.

Each seminar included a brief presentation by project staff on telecommunications technologies, with examples from experiences in the human services field. But the emphasis was placed on the dynamics of using the technology appropriately, rather than on the equipment itself. The seminars focused on identifying needs in the DD field where telecommunications media might make a difference.

The specific communications-related needs suggested by seminar participants were later classified into a number of broad themes. Described in more detail in a project working paper,* the themes can be summarized as follows:

- training and support of parents, paraprofessionals, and nonprofessionals
- training and support for high-involvement professionals
- training and support for low-involvement professionals
- evaluation and individual planning
- upgrading service in rural areas
- transfer of expertise among organizations
- facilitating existing AAUAP activities
- protection and advocacy for DD clients
- development and utilization of "good practice" procedures
- collaboration among DD researchers
- public awareness and education programs
- communication within UAPs
- more efficient utilization of existing resources
- medical assistance.

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* See "Telecommunications and Service to the Developmentally Disabled," Vol. 1, pp. 17-25, listed in Appendix 7.

With each theme, there is an associated cluster of communications-related needs, and each need suggests points where telecommunications services might be appropriately employed. But more possibilities were generated than could be effectively demonstrated with the time and resources available.

Working from those broad themes and other more specific application ideas received in response to the initial working paper and with the help of the project advisory board, the project team identified certain key areas in which to concentrate its resources. AMC launched three activities:

1. A coordinated program of telecommunications applications based in Vermont (chapters 1, 2, 3, and 4 of this report). Given the abbreviated timespan of the project--originally one year, later extended to two years--the AMC approach was to organize several associated demonstration activities in a single geographic area. AMC chose the state of Vermont as the site for a coordinated program of applications. The focus was on communication services in the following priority areas: those in rural/remote areas, parent advocacy training, and linkages among community-based care providers and DD advocates. AMC staff conducted these Vermont demonstrations between July 1979 and September 1980.

2. A national demonstration of electronic mail services among UAPs and related centers (Chapter 5). In order to improve communication among specialized DD training centers (UAPs), staff from the Institute for the Future in collaboration with AAUAP, organized a national telecommunications network to facilitate inter-UAP exchanges. The Institute conducted this demonstration from November 1979 to September 1980.

3. A service to provide limited technical consultation to organizations interested in making innovative use of telecommunications in the DD field (Chapter 6). Throughout the project, the team made efforts to provide interested groups and individuals in the DD field with technical consulting on appropriate uses of telecommunications. Although this technical assistance was provided primarily by AMC staff, both the Institute for the Future and other project consultants responded to specific requests for assistance.

APPROACH TO EVALUATION

Clearly, these were demonstrations in real-world settings, not experiments in laboratories. As a demonstration, the focus was on establishing a successful, operational system. By contrast, a field experiment would have put a premium on testing various hypotheses, regardless of whether such tests resulted in successful systems. When there was a choice between competing needs of implementation and evaluation, implementation was almost always chosen. The changing nature of the demonstrations presented the Institute with unique challenges in planning its evaluation effort. Changes in technology types and transmission systems were frequent, as well as shifts in the user groups themselves. Those variables often controlled in laboratory or field experiments were uncontrollable here.

The Institute began with a case-study approach for tracking and documenting the activities of each of several principal user groups. From the outset, we were conscious that we were likely to be evaluating activities that were themselves constantly in flux. We needed a "moving target" methodology.

The fundamental evaluation question was, "What roles, if any, should telecommunications play (directly or indirectly) in the effective provision of services to developmentally disabled persons?" The demonstrations were efforts to show particular roles that telecommunications might play. More specifically, the evaluation effort sought to answer these questions for each activity: "What happened? Did it work?"

Related to those basic questions, the evaluation strategy also sought to determine the degree to which basic project goals were met. It was, for example, a prime Alternate Media Center objective in this demonstration to provide an effective, affordable, and accessible telecommunications service for the DD community. By effective, they meant a communications service that met real needs, not artificially created needs. By affordable, they meant a system that was within the pocketbook reach of the many nonprofit and public organizations working in developmental disabilities. By accessible, they meant the technology had to be readily available to most potential users, no matter where they were located. Furthermore, it had to be relatively simple to use, so as not to frighten novice users away. These and other AMC benchmarks and criteria* served as additional checkpoints for the evaluation.

The "What happened?" questions required the shadowing of AMC activities as they organized the principal demonstrations in Vermont. It is important to realize that effective organizers of such demonstrations often do not have the time or the inclination to record fully just what it is they do. The AMC staff was no exception. They moved quickly, often following their own intuition about what to do when. Thus, an important part of the evaluation effort was devoted to tracking what was happening at each stage. This was accomplished through periodic site visits by evaluation staff, interim reports submitted to AMC staff for response, and update sessions with AMC field staff in Vermont via teleconference.*

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*See "Telecommunications and Service to the Developmentally Disabled," Vol. 3, listed in Appendix 7. The document provides a complete description of project criteria employed.

The "Did it work?" question was geared toward identifying the kind of information that decision makers in the DD field would need to decide whether to implement similar telecommunications services. Absolute answers to "Did it work?" are not possible in the context of a demonstration project, but there are results that can be of direct assistance to decision makers. (See Part III for conclusions and policy implications.)

We sought to build in as comprehensive an evalution of each activity as possible, given the limitations from an evaluation point of view of the demonstration project orientation. The following evaluation tools were used during the project:

- interviews (telephone and in-person)
- questionnaires
- tape recordings for audio teleconferences with content analysis
- transcripts for computer conferences and computer mail, with limited content analysis
- log sheets and usage statistics
- cost analyses.

Figure 1 shows how those tools were applied to the various activities described in this report. Data on the Vermont activities were collected from September 1979 through December 1980. Additional follow-up and continuation information are also provided for activities through June 1981. Data on the national demonstration of electronic mail were collected from November 1979 to September 1980. In general, we

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*We considered having an onsite person to assist in gathering evaluation information, but decided against it. In retrospect, a more constant presence would have added to our ability to track more closely what happened.

FIGURE 1:

Evaluation Tools

yes ■
no ▨
N/A ☐

	Vermont-Based Demonstrations										National Activities
	Consumer and Community Advocacy Groups					DD Professionals		State Agencies	Personal Computer	Computer Conferencing	Electronic Mail
	VARC VSPP	Parents Network	VCIL	UDPV	DD Council	I-Team	Franklin Center	DMH/DVR		AAUA	
Goals analysis	■	■	■	■	☐	■	■	☐	■	■	■
Collection of Usage Statistics	■	■	■	■	■	■	■	■	■	■	■
Documentation of Basic Costs	■	■	■	■	■	■	■	■	■	■	■
Cost Comparisons with Alternative Means	■	■	■	■	■	■	☐	☐	☐	☐	■
Technical Quality Assessment	■	■	■	■	■	■	■	■	■	■	■
Documentation of Demonstration Organizational Process	■	■	■	■	■	■	■	■	■	■	■
Pretest of Communication Process	■	■	☐	☐	☐	■	☐	☐	■	■	■
Field Notes from AMC Staff and Telephone Interviews	■	■	■	■	■	■	■	■	■	■	■
Records of Ancedotes, Problems, etc.	■	■	■	■	■	■	■	■	■	■	■
Site Visits By IFTF Staff	■	■	■	■	■	■	■	■	■	■	☐
Analysis of Audio Tapes (Sampling)	■	■	■	■	■	■	■	■	▨	▨	▨
Analysis of Transcripts	▨	▨	▨	▨	▨	▨	▨	▨	■	■	■
Questionnaires	■	■	☐	☐	■	■	☐	☐	☐	☐	■
Telephone Interviews	■	■	■	■	☐	■	■	■	■	■	☐
In person and Group Interviews	■	■	■	■	■	■	■	■	■	■	☐

used as many of them as possible in a given demonstration, in as systematic a fashion as possible in this rather nonsystematic environment.

PART ONE: VERMONT ACTIVITIES

PROLOGUE TO PART ONE

Vermont is a rural state, characterized by rough terrain and harsh winters. Of its total population of 511,000 about 8,400 are developmentally disabled. Of the total DD population, only 400 are institutionalized. Others are in various community-living arrangements throughout the state. Thus, DD people are likely to be located a long way from other DD people and from the services they need. Getting around can be quite a problem. Fifty-five percent of Vermont's 14,000 miles of roadway are unpaved, and adverse road conditions--ice, snow, mud-- prevail at least six months a year. For persons in wheelchairs, it is tougher and public transportation is largely nonexistent in most areas. Vermont's remarkable beauty belies the struggles of many of its residents

Vermonters themselves are sensitive to the problems of DD people; they've shown a strong commitment to DD service delivery and outreach. DD consumer groups meet when they can assemble their members in a common location, which is not often. Special educators ride circuit to maintain a semblance of regular contact with clients in the field. State agencies struggle to stay in touch with their constituencies and field staffs. The strong support of such groups was a factor in AMC's choice of Vermont as the site for the demonstration projects. And the challenge of designing and implementing telecommunications demonstrations in this rural setting was seen as a potential model for similar initiatives elsewhere. If they could work in Vermont, there was a good possibility that they could work in other areas with equally scarce or perhaps significantly greater resources.

The first step in such demonstrations was to identify the basic resource--people. Beginning in July 1979, AMC staff member Pat Quarles moved to Vermont from Reading, Pennsylvania, where she had been instrumental in setting up the very successful interactive cable television system for senior citizens. Red Burns, AMC's Executive Director, while not literally moving to Vermont, was commuting frequently from New York City. Red Burns came to the project with a broad background in introducing new media to local communities. Eileen Connell, Gary Shober, Martin Elton, John Carey, and other AMC staff were also frequent participants in the Vermont demonstrations. While the specifics of the Vermont demonstrations had not been tried before, AMC brought to the project an extensive background of analogous experience.

The initial stage involved listening to and getting to know the DD community in Vermont. This was a trust building stage. AMC did not come into Vermont with a rigid idea of just what sort of system would emerge. Rather, they began by trying to understand the needs of the Vermonters with whom they hoped to work. Their initial contacts within the state were with Director Wayne Fox and the staff of the Center for Developmental Disabilities at the University of Vermont, a UAP satellite facility, and Executive Secretary Stephen Chupack and members of the state Developmental Disabilities Council. Those two groups helped AMC identify and develop working relationships with other DD groups throughout the state. They also helped clarify what directions project activities might take in Vermont.

Members of the governing body of the center, the Administrative Policy Committee, helped AMC design consumer and community group uses of telecommunications. (See Appendix 1 for a list of members of this advisory group.) And the Developmental Disabilities Council (Vermont's DD Council is an office within the state's Agency of Human Services) provided administrative support for continuation of successful demonstrations. Under its auspices, Vermont Telecommunications, Inc. (VTI) was established. VTI is a nonprofit agency that oversees ongoing operation of the telecommunications applications developed under this project.

In responding to the identified needs, AMC built upon existing telecommunications resources. The most obvious starting point was the telephone system. In Vermont, however, the ubiquity of the telephone masks the reality of eight separate telephone companies within such a small state. The level of conventional telephone service within the state varies dramatically. Intrastate telephone rates are high compared with interstate rates. More importantly, though not unique to Vermont, is the prevailing image about the purpose of telephones. They're for calling somebody up, not for holding meetings--or so the stereotype goes. This project focused on group communication and, thus, implied a use of the telephone network that still seemed unusual. Also, the phone companies were simply not well oriented to the notion of group, rather than one-to-one, interaction via telephone.

While the telephone system was the principal technological resource, AMC developed and implemented three activities:

- o A telephone conferencing system was developed that included participation in group meetings via telephone by more than a dozen different user groups (Chapter 1).
- o Personal computers were used by a small group of cerebral palsy adolescents and adults. Vocational and educational uses were explored as well as message exchanges through the computers via telephone lines (Chapter 2).
- o Computer conferencing (a group medium involving exchange of written messages via telephone) was used by groups of DD professionals in Vermont and two other states for sharing expertise among people who work with DD clients in institutional settings (Chapter 3).

The telephone conferencing uses were by far the most pervasive.The principal accomplishment of the telephone conferencing applications described in Chapter 1 was the extent to which so many diverse groups were able to adapt and use this relatively low-cost service. Between November 1979 and December 1980, over a dozen different groups used a variety of audio conferencing systems. All conference calls were requested by the users themselves, and group members worked with project staff to identify and respond to their own individual communication needs and priorities.

Potential participants were informed of available options and invited to access the systems freely. No user group was required to pay for such services from September 1979 to September 1980. Arranging for a conference call was as simple as contacting project staff, apprising them of the time and date of a proposed telephone meeting, and providing a list of participant locations and phone numbers.* A group had only to satisfy the general project criteria of an active involvement in issues relating to the needs of developmentally disabled children and adults.

The conferencing technology was not inordinately complex. The early conference call meetings were held using the only group meeting service most telephone operating companies have--the telephone conference call service. The technology employed is not the most up to date, cost is relatively high, and, at least during this project, there was a high probability of being greeted by a grumpy--sometimes downright surly-- operator. But this service was a reasonable way to start, to get a sense of the likely traffic patterns that would emerge in Vermont. It was used for large group calls during the early months of the project.

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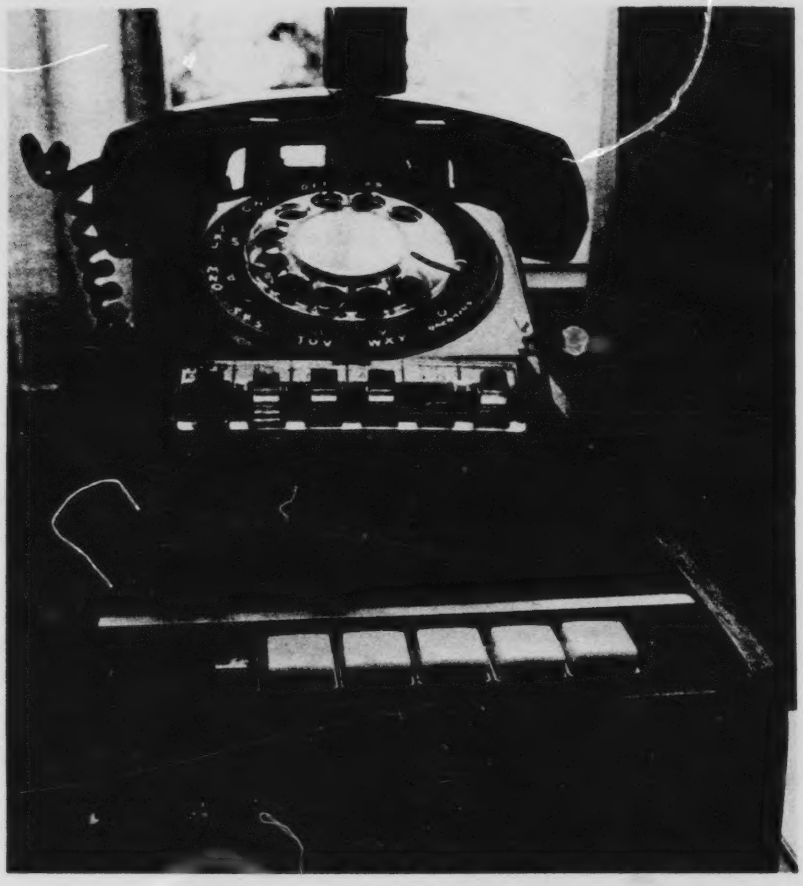
*Each group leader was asked to complete a log-sheet to be submitted to project staff following a conference call. The log-sheets included the above participant information as well as the group's purpose for holding the meeting, reports of technical problems encountered during the call, and overall comments about the experience. Later in the demonstration period, additional information was requested that related to the possible cost of holding the same meeting in a face-to-face session. The log-sheets were an invaluable source of evaluation data. A sample copy of the log-sheet can be found in Appendix 1.

In November 1979, to provide independent, low-cost capability for holding telephone meetings, AMC set up a five-line telephone "bridge" in Burlington. (A bridge is a device for connecting multiple telephone lines in order to hold a conference call.) This five-line bridge was used for small group meetings; the telephone company conference call service continued to be used for larger groups. Figure 2 below shows the five-line bridge.

FIGURE 2
Telepatcher



KTS 500 Telepatcher, Telephonic Equipment Corporation, Irvine, California.

Usage patterns for these two audio conferencing methods--the telephone company conference call service and the project's five-line bridge--were carefully tracked and provided the basis for selecting a permanent telephone meeting system. AMC decided to implement a nondedicated system using standard telephone lines rather than a dedicated system, which would have required private, leased lines and fixed locations. Although there are audio quality differences between the two types of systems, the nondedicated network allows more flexibility in that virtually any telephone anywhere in the state can be used for a conference call.

By July 1980, AMC had installed a larger capacity bridging mechanism in Burlington. This mechanism was actually two nine-line telephone bridges linked to act as one bridge with 18 lines. This larger capacity bridge is called a meet-me bridge because calls are automatically linked when participants call a special phone number. There is no need for an operator to phone the participants.

The various types of telephone lines into the bridge were projected on actual conference call usage patterns that grew out of the early trials. They were designed to accommodate calls from different areas of the state at minimum overall cost and in a fashion that allowed participants to access a conference without being charged for their calls.

An assortment of Vermont groups used these telephone conferencing services: long-time advocacy associations, newly formed consumer groups, parents, professionals, and, of course, the consumers themselves. (See Table 1 for a brief description of each demonstration user group.) All these groups were to some extent self-selected. Conferencing services were made available to them without charge for use in ways best suited to needs as they perceived them. Groups chose to participate once they were aware of the availability and potential of the service. There was no rigid pre-selection process.

TABLE 1

Audio Conferencing User Groups in Vermont

Vermont Association for Retarded Citizens (VARC)	A 30-year-old advocacy organization comprised of more than 1,100 consumers, parents, professionals, and other interested citizens.
Vermont Surrogate Parent Program (VSPP)	A volunteer program that provides surrogate parent assistance to handicapped children whenever the child's natural parents are unknown or unavailable for the purpose of deciding on educational plans.
Vermont Center for Independent Living (VCIL)	A consumer group of mobility-impaired individuals who support and encourage independent living capabilities among the handicapped in Vermont.
United Disabled People of Vermont (UDPV)	A statewide consumer-oriented advocacy group begun in 1978; focus on handicapped helping themselves.
Vermont Developmental Disabilities Council	The federally funded body responsible for DD planning and advocacy activities at the state level.
United Cerebral Palsy of Vermont	A chapter of the national advocacy organization for people with cerebral palsy, their parents, and service providers.
Vermont Coalition for the Handicapped	An umbrella organization comprised of 21 groups involved in local advocacy and professional service delivery for handicapped people.
LGMPH	A mental-health-client advocacy group in Vermont.
Vermont State Interdisciplinary Team for Intensive Special Education	A team of resource professionals based at the University of Vermont who provide technical assistance and training to local school districts in their efforts to provide effective and appropriate educational programs for severely handicapped students.
Franklin-North Grande Isle Mental Health Service, Inc.	A nonprofit regional organization that provides training and other services to DD clients and their parents or service providers.
Department of Mental Health	Part of the Vermont Agency of Human Services.
Division of Vocational Rehabilitation	Part of the Agency of Human Services responsible for job training, placement assistance, and adaptive equipment funding for people with handicapping conditions.

The confidentiality of the communication occurring among participants was an early source of concern expressed by users, particularly DD professionals, and project staff. Using the regular telephone network for conference calls, rather than a dedicated network, which would have used private lines only accessible to group members, meant that the calls were only as secure as the normal phone lines being used. Early in the demonstration, some groups agreed that discussions of specific clients or care providers would be confined to using first names only or previously defined codes. (The meet-me bridge includes a special security device that can be used by a group leader to "lock-out" other callers once a meeting has begun. Although this service has been operational since October 1980, it is seldom used.)

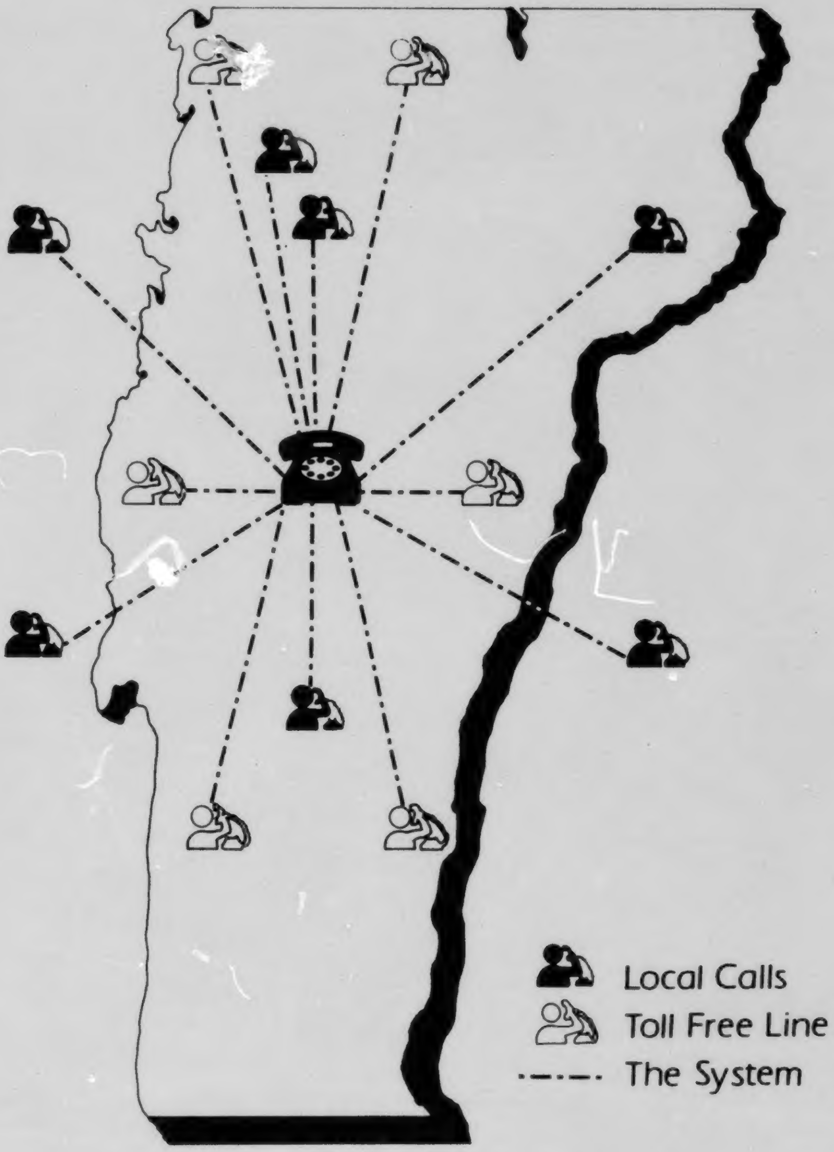
Although project staff frequently sat in on audio conference sessions, they acted primarily as troubleshooters should a technical problem arise. Even using a fairly simple technology, such as audio conferencing, technical problems can be numerous and serious. During the course of these demonstrations, participants faced problems, such as poor sound quality, inability to hear one or several participants, being locked out of a conference (calling in at the right time, but the system not answering), and others. Some of the problems were attributable to transmission line differences; some were related to deficiencies in the equipment. In any case, getting the "bugs out" of the system occasionally proved as formidable a task as it has in more complex technology demonstrations.

AMC did not impose any formal structure or format on the conduct of telephone meetings. As a matter of fact, a few group leaders commented upon the lack of formal training offered by project staff in audio conference usage. AMC's position was that a learn-by-doing style was more appropriate than formal training, especially given the diversity of the user groups and the absence of clear training principles for effective audio conferencing.

Users were instructed in the operation of the equipment (e.g., amplified telephones), encouraged to learn how to track down technical problems (e.g., identify the source of the extraneous noise on phone lines), and given pointers on possible protocols (e.g., roll-calls, having speakers identify themselves). Aside from basic tips, participants were largely left to their own devices to create appropriate formats for the conduct of their meetings.

A common thread evident among audio conferencing user groups was their remarkable adaptability and failure tolerance. Although the descriptions that follow may give the appearance of a pre-defined structure, they distort to some extent the real trial-and-error nature of the demonstrations. The combination of groups in the following descriptions (advocates, consumers, professionals) is intended to make it easy for readers to draw comparisons with their own experience, not to mask the obvious group-to-group diversity.

Chapter I: Audio Conferencing

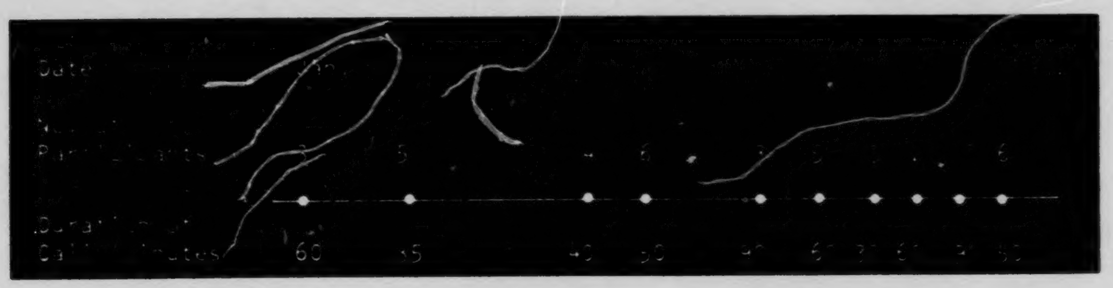

Local Calls
Toll Free Line
The System

CONSUMER AND COMMUNITY ADVOCACY GROUPS

Vermont Association for Retarded Citizens and Vermont Surrogate Parent Program*

For over three decades, the Vermont Association for Retarded Citizens (VARC) has worked to further the rights of the handicapped through its nine affiliated local chapters. Its membership of about 1,100 people statewide, consists of local residents and parents of handicapped children. VARC does not provide direct services to clients. Rather, it has been instrumental in promoting the development of service delivery programs by both state and private agencies. Its membership is also active in encouraging legislative action, disseminating referral information, and providing advocacy training.

During the demonstration, VARC's membership used telephone conferencing as an administrative tool. The subjects of their calls included legislative information, advocacy training, general administrative topics, and coordination of activities among local chapters. VARC scheduled 10 conference calls over a one-year period beginning



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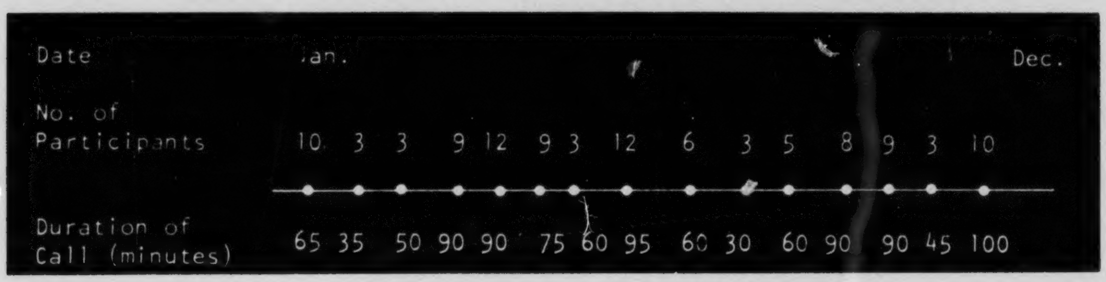
*For more detail on these two groups' use of telephone conferencing, see Gail T. P. Wickes's "Advocacy as Usual--By Telephone," and Karen Thomas's "On-line with the Vermont Surrogate Parent Program," User Perspectives, Institute for the Future, June 1981.

in January 1980, using both the five-line bridging device and the larger capacity, permanently installed meet-me bridge. Typically, about five participants met via the phone system for an average of a little less than an hour for each call.

The Vermont Surrogate Parent Program (VSPP) is a federally mandated program administered by the Vermont State Division of Special Education. VSPP provides training and support to individuals who volunteer to act as surrogate parents for handicapped children who are wards of the state or whose parents are unable to adequately represent them. In general, these children are in a state institution or a community-care living arrangement. The surrogate parent is responsible for representing the child within state service delivery agencies and institutions and for reviewing and making recommendations on individual education plans (IEPs) developed for the child.

VSPP's nine regional coordinators and the director of the program participated in 15 conference calls between January 1980 and December 1980. Calls typically concerned program coordination and administration, but some calls included guest speakers, such as the coordinator of the Vermont State Interdisciplinary Team for Intensive Special Education and representatives from other state agencies that serve the developmentally disabled.



One hastily arranged call among three regional coordinators, for instance, was used to identify an additional volunteer for a child who needed a surrogate parent right away. VSPP calls averaged approximately seven participants per call. The typical duration of each call was about 70 minutes.

An incident during a VSPP call early in the demonstration provides a good illustration of the importance of the conference calls for the group members. One conference call in March 1980 was plagued by technical problems and poor sound quality. Surprisingly, these problems were not reported to the project conference coordinator until after the call was over. When asked why no one called to report the problems during the call, several people in the group responded that they did not want to miss any of the discussion by taking time out to report technical problems.

Conclusions

Conference calling became an integral part of VARC's and VSPP's organizational activities. In late 1980, VARC became involved in a project to provide advocacy training in independent living. The project called for conducting several regional training sessions in conjunction with the Vermont Coalition for the Handicapped via the audio conferencing system.

As a result of the demonstration activities, VSPP revised its official operational manual to include group telephone meetings at regular six-week intervals in addition to its semiannual face-to-face statewide coordinators' meetings. Prior to the introduction of audio conferencing, meetings between the VSPP director and regional coordinators were held only rarely--once or twice a year. The director relied upon one-to-one phone calls or smaller group meetings reinforced by mailings of program materials and other resources. With telephone conferencing, meetings of the entire group can now be scheduled on a more regular basis.

VARC's group leader indicated during an interview that the decision to call a meeting involving members in scattered locations is now less of a problem to schedule because her first assumption is that meetings will be held via the telephone system; travel for meetings is the second-choice option.

The administrative focus of VARC and VSPP calls encouraged them to develop similar meeting styles. Typically, agendas were pre-set and resource material sent out to participants prior to the call. The leader's role during the calls was important to ensure that agenda items were covered and to provide control over the flow of the discussion. Individual participants, however, frequently raised additional topics not specifically covered by the agenda. Direct participant interactions were evident as well as purely social exchanges. But the latter were generally confined to the beginnings and ends of meetings.

Users experienced few problems using the equipment, and they rated conference calls "good." Questionnaires regarding participant reactions to audio conferencing were conducted with both VARC and VSPP group members. An initial survey was performed in March 1980 regarding early conference call usage; a second follow-up survey was performed nine months later.* Fewer than half the respondents reported experiencing any problems with the equipment. When asked to give an overall rating of conference quality, 11 of the 17 respondents rated the conferences "good" or "very good." (An equal number also said that the conferences were generally about the right length.)

Participants preferred dial-in conferencing to operator-assisted conference calls. The second-round questionnaire sought to elicit responses regarding user assessments of the different conference call methods employed during the demonstration: operator-assisted calls and a dial-up bridging arrangement. All of the respondents who indicated a preference (12) chose the dial-in arrangement over the operator-assisted calls. Overall, they indicated that the dial-in method was easier to access (12); reduced the time it took to start the meeting (11); and had sound quality perceived as superior to operator-assisted calls (8).

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*See Appendix 1 for copies of the questionnaires with numerical results. More than half the participants responded to the first questionnaire (11 of 20 VARC participants, 6 of 9 VSPP participants). All of the first-round questionnaire respondents had participated in at least four telephone conferences, and more than half had been involved in six or more calls. Over half the respondents had used both an amplified telephone (typically a Western Electric 4A Speakerphone) and their own phone for some of the calls. (These numbers include both single group sessions as well as joint sessions conducted by VSPP and VARC as part of a "Parents Network" conference call series. The parent network usage is discussed in the next section.)

Users said conference calls positively impacted their organizations. Another objective of the second-round survey was to attempt to gauge users' perceptions of impacts on their organization that were attributable to the use of audio conferencing. Most participants perceived some improvement in group communication, travel schedules, utilization of outside resoures, decision making, and achievement of organizational goals. VARC participants also perceived improvements in member participation, training, and quick response to problems; VSPP participants had mixed reactions in those categories.* Only one participant felt audio conferencing negatively affected any of those factors. Interestingly, that participant indicated that all those factors were either unchanged or worsened by conference calls with decision making most adversely affected.

Participants voted to continue using conference calls. Given a choice among four options for future telephone meetings (schedule more, schedule fewer, continue at present rate, discontinue) 11 of the 15 respondents from both groups wished to continue telephone meetings at the present rate, 3 wished to schedule more telephone meetings, and only one wished to discontinue their use.

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*See Appendix 1 for numerical responses.

Parents Network

Parents of DD children have special needs. The responsibility for insuring that such children receive the most appropriate services rests ultimately with parents. But, in order to use these services, parents need up-to-date information about what services are available and how to access them. Also, the prodigious demands of caring for a child with special needs may often isolate parents from outside sources of personal and emotional support. In December 1979, group leaders from VARC and VSPP combined forces to form a joint telephone conferencing network aimed at addressing the special needs of parents and bringing them to the attention of local officials and DD service delivery agencies.*

For the most part, members of the two groups had not met before the calls. An informal working relationship was evident among the leaders, but the rank and file had not previously been involved in joint activities although in many cases they lived near one another.

This telephone network of parents and parent advocates held 11 conference calls over the next seven months. Twenty VARC members and VSPP's nine regional coordinators participated in the calls. The selection of participants was based on the geographical proximity of VARC members to VSPP regional coordinators. Participants were often joined by guests from various DD service delivery agencies, state officials, and even members of the state legislature. The leaders developed agendas for the calls from members' suggestions of areas of concern. Guest speakers were selected and invited to attend the sessions based upon their familiarity with suggested topics.

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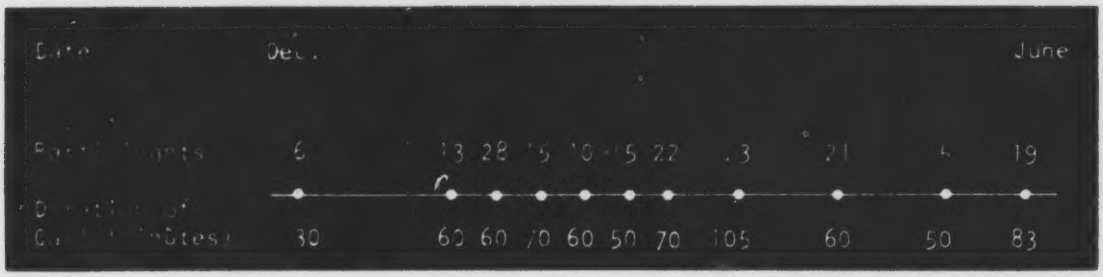
*In addition, as part of the original strategy, the project team hoped to extend the scope and coverage of the parents network through the use of a special frequency on FM radio known as SCA (subsidiary communications authorization). This service would have allowed the parent network telephone conferences to be broadcast to specially equipped radio receivers. Thus, homes of other interested parents would then be able to hear the discussion. These parents might also be able to provide feedback to the conference group by way of their home telephone. Because of a series of procedural delays, the application was not implemented, although considerable time was spent in planning and technical design.

Calls included open discussions among participants, specific presentations by the outside resource people, and question-and-answer periods. Topics for the calls included solved and unsolved problems with service delivery agencies, legislative strategies for lobbying efforts, appropriate educational programs for handicapped children, and services available to "exceptional people" over 21 years of age.

In general, calls were about an hour in length and included an average of 16 participants per call. In one case, as many as 28 people were involved in a joint call. Because of the number of participants and the occurrence of these calls in the early stages of the demonstration, all were handled via the telephone company conference calling service. To facilitate access by members of both groups who were scattered throughout the state, amplified telephones (Western Electric 4A Speakerphones) were installed in 13 locations statewide. This equipment allowed small groups of participants to gather at convenient locations for linkage into the conferences via a single telephone line. This placement of equipment was devised to take advantage of the proximity of both groups' members to one another in various regions of the state.



Parent network calls were relatively formal compared with other user groups. The large number of participants necessitated a structured format with heavy emphasis on the leadership role in directing the discussion. Typically, the leader performed a roll-call,* gave the agenda, introduced guest speakers, assigned speaking turns, decided what topics would be covered and in what detail, and when the call should end. When a guest was present, interactions among participants were rare. In these cases, purely social exchanges not related to discussion topics were minimal. When they occurred it was typically prior to the roll-call or at the end of the meeting.

Although the calls were rather formal, they provided a convenient forum for information exchange regarding parent service delivery concerns. The parent group interactions with representatives from DD service delivery agencies had not occurred on a regular basis prior to the conference calls.

Conclusions

Supportive exchanges among participants were evident. The formal nature of the calls did not preclude supportive exchanges among the participants particularly in calls where no outside guest was present. During one of the joint conferences, for instance, a parent mentioned that she was considering a group home placement for her disabled child. Another parent had recently placed her child in a group home environment. The second mother, who only knew the first through conferences, shared her feelings about "letting go" and deciding to make the placement. She also provided examples of interesting activities that her child was now involved in at the group home as well as the effects of the placement on the rest of her family. The first mother was helped by hearing from someone "who had been there."

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*In operator-assisted calls (Bell System) the operator calls the roll before signing off at the beginning of the meeting. Group leaders in these calls generally performed a verification of the operator's roll-call by repeating the procedure to identify groups of participants at certain locations.

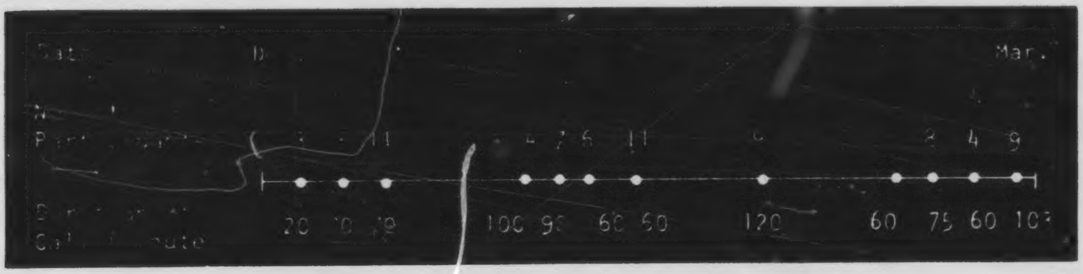
Group leaders were not comfortable with the formal structure of the calls. Although group leaders were initially enthusiastic about joint calls, they eventually agreed in June 1980 to discontinue them. In interviews, leaders expressed the general conclusion that conference calls were "more like forums than meetings" and required more forceful leadership than they preferred to exercise. They indicated a preference for a change in the format of the calls to encourage more individual participation and to reduce the leader's profile. When asked about the reasons the calls were discontinued, one leader reiterated the concern about the formal structure of the calls and termed them "useful but unwieldy."

Vermont Center for Independent Living and United Disabled People of Vermont.

Two consumer advocacy groups made up largely of mobility-impaired adults used telephone conferencing during the demonstration period: the Vermont Center for Independent Living (VCIL) and United Disabled People of Vermont (UDPV). The two groups share several of the same members (most of the VCIL executive board are also members of UDPV), but they used telephone conferencing in separate sessions. The organizational priorities of the two groups were a factor in the different uses of telephone meetings.

VCIL is a young organization that grew out of the recent movement for support of independent living arrangements for handicapped individuals. Its mandate is to support and encourage the development of independent living capability among handicapped people in Vermont. VCIL is active in encouraging such activities by promoting legislative initiatives, encouraging appropriate help and service delivery by public and private agencies, and by providing for peer counseling and support for the handicapped.

VCIL held 12 conference calls between December 1979 and March 1980. Perhaps because of its participation in this activity during the formative stages of the organization itself, its conference calls reflected a heavy emphasis on setting goals and defining priorities for future activities. The calls included executive staff and board members concerned with such issues as organizational by-laws, program development, office space identification, and continuing funding.



Typically, about seven participants were involved in each call, which lasted approximately an hour and 15 minutes. Conference calls were generally chaired by the group leader and included an open discussion followed by the submission of motions to be accepted or rejected by a poll of group members present. An agenda was generally pre-determined, although other items could be added to it. On at least one occasion, however, the format was expanded to include a group discussion on legislative issues with a member of the Vermont state legislature.

VCIL began using conference calls in December 1979. But by early spring tensions had developed between some of its members and AMC project staff in Vermont. These tensions developed from conflicts between the project's "demonstration" orientation and the responsibilities inherent in the project's role as a "service provider."* VCIL's board of directors wanted more direct say in overall project decision making than was agreed upon by representatives from other user groups that made up a project consumer applications advisory committee. As implementers of a "demonstration," rather than providers of an established service, AMC staff maintained responsibility for project decision making. VCIL eventually discontinued its use of telephone conferencing as a part of project activities in March 1980. It was the only user group in which members discontinued their calls based on procedural difficulties with project staff.

UDPV's experience with audio conferencing was quite different from that of VCIL, even though their conferences involved several of the same people. UDPV is a grassroots volunteer organization with a longer history of activism in the field. Originally, AMC had designed an application to link UDPV members with legal resources, social service providers, and clients for problem-solving sessions on client concerns. The basic premise was that such a grouping would provide important input from several sources in solving a particular client's service delivery problems. In such an activity, UDPV members would act as mediators and client advocates. This version of how UDPV would use telephone conferencing was not realized. Early in the demonstration, UDPV members said they had no occasion to meet with clients, service providers, and other resource people. The abandonment of the original plans appears not to have been a conscious decision, but rather a response to prevailing circumstances. Once a particular pattern of use had developed, as a support network, it simply progressed naturally in that direction.

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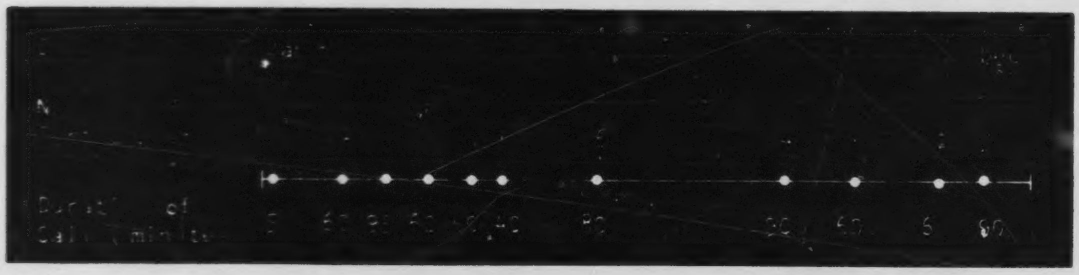
*This type of conflict between the goals of the demonstration and the responsibilities of a service provider is one of the recognized pitfalls in telecommunication field trials. For a discussion of the concept, see Martin C. J. Elton and John Carey, Implementing Interactive Telecommunications Services: A Report on Problems Which Arise During Implementation of Field Trails and Demonstration Projects, New York: Alternate Media Center, New York University School of the Arts, October 1979.

UDPV began using conference calls in January 1980 and has continued to do so through this writing. Their continuing involvement indicates the perceived utility of the calls for this group. Usage levels dipped drastically during the summer and early fall due primarily to the absence of the group leader and a changeover to the new dial-in conference call method that requires each participant to call into the "bridge" at a predetermined time. Conference call use by this group, however, increased with the onset of a rugged Vermont winter and the attendant travel difficulties.

UDPV calls typically involved about four participants and lasted about an hour. From October through December 1980 (the end of the data collection period), UDPV scheduled a regular biweekly conference call using the telephone conferencing system.



Conclusions

VCIL structured its calls more formally than did UDPV. The Institute conducted telephone interviews with group leaders from both VCIL and UDPV. The two groups perceived meeting formats differently: VCIL's group leader said that more small-group meetings (three to five people) were preferable for their group; on the other hand, UDPV's group leader was concerned about expanding the number of participants in each of their calls. These observations may be directly related to the number of people actually participating from both groups: VCIL averaged almost twice as many participants as UDPV and used a more structured format. UDPV's format was relatively informal with agendas prepared on-line with input from participants. Because VCIL meetings were primarily for the purpose of conducting business and making decisions, perhaps fewer people made it easier. The less formal nature of UDPV calls might have been appropriate for additional participants simply because it meant more topics of discussion and sharing of ideas.

Participants from both groups rate conference calls OK, but express concern about their impersonality. When the Institute conducted telephone interviews with VCIL and UDPV participants in February 1980, the users rated the overall quality and utility of the conference calls "fair" to "good." Some expressed concern about the impersonality of the calls and a preference for face-to-face meetings. One participant, particularly, stressed that given the various disabilities of the group members and their potential or real isolation, it was important for their self-esteem that they meet face to face as frequently as possible. Several users were concerned that their use of conference calling would replace face-to-face meetings. Although mobility impairments made travel more difficult for some group members, it was clear that face-to-face meetings provided compensations, which they did not wish to dispense with altogether.

Developmental Disabilities Council

The Vermont Developmental Disabilities Council (DD Council) has been closely associated with the telecommunications project since the decision to conduct demonstrations in Vermont.* Although the project team's first contact in Vermont was with the director of the Center for Developmental Disabilities at the University of Vermont, they soon brought DD Council staff and members into the planning process. The council authorized its executive secretary to spend up to two days per week on project activities beginning in late summer 1979. This time commitment proved crucial to the project's overall planning and direction. It not only ensured continuous linkages to the council, but also opened communication links with other DD organizations in the state.

The council views itself more as an advocacy and planning group than as a provider of services. Steve Chupack, the council's executive secretary has written: "The council's primary aim is to establish a service system . . . sensitive to the needs of people with developmental disabilities and . . . capable of meeting those needs."

The DD Council was not originally considered one of the project's demonstration groups. Its use of telecommunications resulted in large part from involvement of the council's executive secretary in project planning. However, from January to December 1980, a total of 34 meetings related to DD Council work were conducted via audio (telephone) conferencing. In particular, use of the system facilitated DD Council committee work and helped to involve handicapped consumers in meetings.

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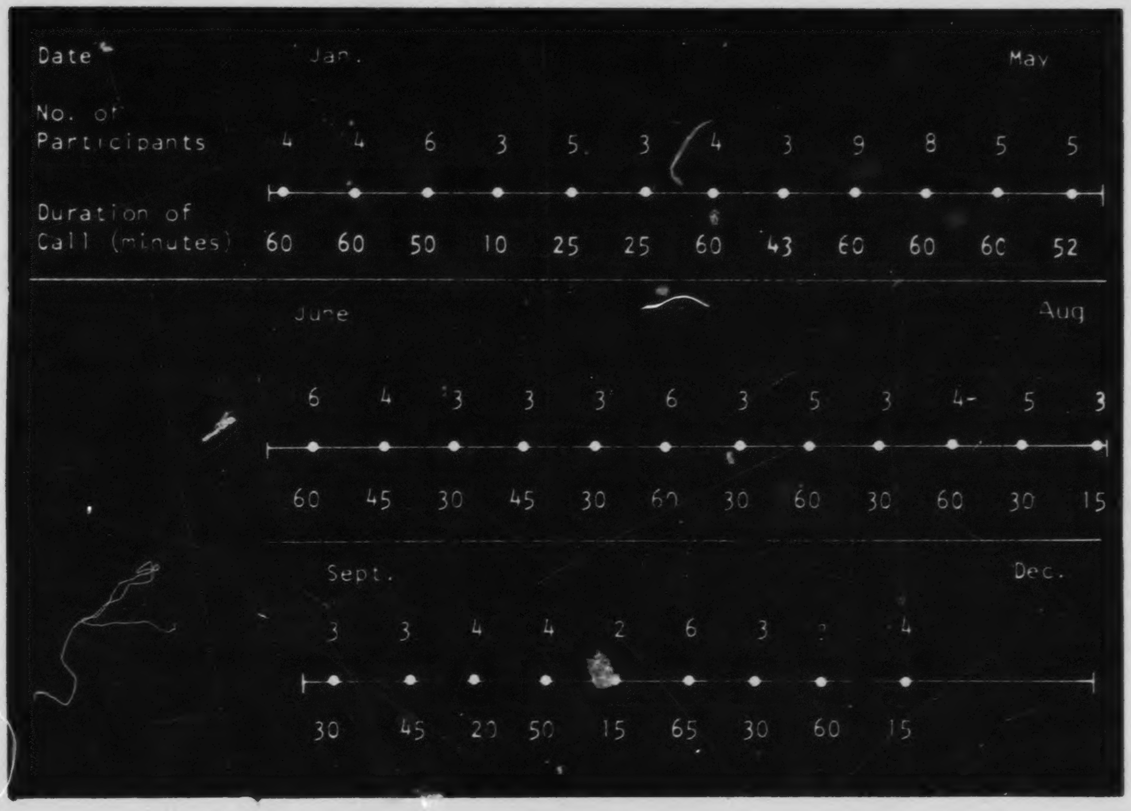
*For more detail on the Vermont DD Council's audio conferencing use see Stephen F. Chupack's "Audio Conferencing and Its Impact on the Vermont Developmental Disabilities Council," in User Perspectives, Institute for the Future, July 1981.

The DD Council's principal use of audio conferencing was by the steering committee as a substitute for some executive meetings. Other DD Council committees or related groups that used the system include the 504 Committee, which was involved with reviewing architectural barriers to handicapped people; the Human Rights Committee; and the By-Laws Committee. The council's staff also used the system to review the state's plan for developmental disabilities. There was no full DD Council use of the system during the demonstration.



One user group--the 504 Committee--probably could not have conducted its activities without a teleconferencing capability. Two of the committee members were mobility-impaired. While they could conceivably have met face to face with the other committee members, it would have been difficult and time-consuming. The original suggestion to initiate the committee work and hold meetings via audio conference came from one of the mobility-impaired members.

Many DD Council members participated in these meetings from their homes. DD Council use peaked in April, June, and September 1980. From September though December, usage declined. Because the council has continued to take responsibility for the system, however, it is expected that ad hoc uses of the system by council groups will continue.

Conclusions

It became apparent toward the end of the project that the DD Council had in fact become a significant user of the system, for it held more meetings than some of the identified user groups. Thus, the evaluation team decided to conduct a summative survey of DD Council members. The survey was designed to gauge the organizational impact of the system on the council itself. During February 1981, the team sent a questionnaire to 34 members of the council. Twenty-three responded.

The following represent the principal conclusions drawn from the questionnaire responses (see Appendix 1 for complete results).

Audio conferencing seems to have facilitated the involvement of some council members. With a teleconferencing option, council members from different geographic areas are less likely to decline to participate in meetings because of scheduling conflicts or travel time requirements they might incur if the meeting were held face to face. As one member wrote, "This was a good way to improve communications within the council. It decreased time limitations and increased involvement of members." Another member wrote, "It has allowed me to participate in more council committees and activities, instead of just council meetings, which take place every other month or once every three months."

While the questionnaire shows generally favorable responses by council members, there are apparently some members who have little contact with council activities; communications technologies did not change that relationship.

Council members believe audio conferencing has favorably impacted their travel schedules. Because winter travel was time-consuming and hazardous, the conferencing option offered obvious wintertime advantages. Members could continue to conduct council business without wasting time. One member said, "The system allowed me to attend a meeting of a council committee that I could not attend in person. It saved me six hours travel time."

In general, council users of the system give it a good to very good rating. Thirteen of the 23 respondents had participated in at least one conference call. As a group they tended to rate their experience highly. The heavier the use (i.e., five or more times), the higher the rating.

Most members said the time commitment of the executive secretary to the project seems to have been well spent. Not only did it not hamper his activities in other areas, but it actually seems to have enhanced his ability to do council work, according to two-thirds of those who responded to the question. There are several individuals on the council, however, who said too much time was invested in the project. But most members said that it has given the executive secretary an added resource to do his job by increasing his contact with individuals and groups working in developmental disabilities.

Council members strongly endorse continuing use of telecommunications in council work and recommend that other DD councils use it too. Eighty-six percent of those responding thought that telecommunications should be an integral part of council work. Responding to the question of whether this experience should be part of normal council operations, one member said: "Absolutely. A far-flung rural state with severe weather cycles often inhibits group face-to-face communications, problem solving, and decision making. Telecommunications is ideal to allow not only rapid dissemination of information, but also more involvement regardless of weather or distance. Long and constant travel is not only wasteful and boring, but also getting prohibitively expensive. Those are just a few of the obvious reasons telecommunications should be an integral part of DD Council work in Vermont."

Audio conferencing is recognized as having particular benefits for handicapped council members. One member said, "Telecommunications truly allow disabled people to participate in the planning process more extensively and effectively." In addition to audio conferencing for council business use, several members saw the potential for expanding telecommunications services directly to consumers. One council member commented, "We should also assist the development of communications for the disabled themselves through . . . personal computers and other types of communication systems." A member of the council with a developmental disability wrote, "There are many severely disabled individuals with a lot of potential to creatively use this equipment."

Several council members offered ideas for new and expanded uses of telecommunications. Having achieved a certain amount of familiarity with this technology, council members now are in a position to think of ways in which they would like to see telecommunications applied in the future. Among their suggestions:

- "Put a meet-me bridge in each county--to be used by social service and mental health agencies to contact clients for outreach and follow-up on a regular weekly or semimonthly basis, thereby increasing communications, but not preclude regular face-to-face meetings. A group could meet via bridge at given times each week, discuss problems, share information; confidentiality could be maintained by the use of coded names or numbers."

- "Train and inform parents."
- "I would like to see the personal-computers experiments extended to a wider range of the DD population."
- "Networking of DD individuals for their own personal use."
- "It should be offered and demonstrated to more voluntary groups and associations relative to sending pertinent messages to the DD Council; the latter should also strive to use this medium to send pertinent information to the volunteers."
- I would like "to use it for my respite care committee, which is composed of people throughout Vermont."
- "A communications system should be available to group homes statewide, also schools and other educational uses."

Other Consumer and Community Uses

In addition to the groups described earlier, three other community-based organizations have used telecommunications services provided by the project: the local (state) chapter of the United Cerebral Palsy Association; the Vermont Coalition for the Handicapped, an umbrella organization made up of 21 groups involved in both local advocacy and professional service delivery for handicapped children and adults; and a client advocacy group made up largely of current and former clients of the Department of Mental Health (LGMPH*). Each of these groups has held as many as five meetings using the audio conferencing system.

United Cerebral Palsy and the Vermont Coalition for the Handicapped used conference calling primarily for administrative purposes in coordinating activities among their respective offices statewide. The mental-health-client advocacy group used conference calls to aid in the development of a patient support network. Their calls involved group members who are interested in furthering the civil-rights movement for mental-health patients in Vermont.

Members of LGMPH received their first introduction to conference calls as participants in a series of calls scheduled by the Vermont State Department of Mental Health for a consumer advisory committee of the agency. During the course of the consumer advisory committee calls, participants became interested in holding their own group meetings via the conferencing system. LGMPH held four calls during the period from October to December 1980, totaling four hours of system use. Their calls are generally scheduled during nonbusiness hours (evenings and Saturdays). Each call averaged five participants.

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*"LGMPH" is the official name for this group. It's an acronym that means Liberation from Government Mandated Psychiatric Hospitalization.

LGMPH calls were the most informal of any recorded for analysis. Agendas are typically loosely structured. The calls seem to be providing a very important form of interpersonal support for the participants. The group leader's role in the calls is relatively indistinguishable from that of the other participants except that he completed log sheets to be returned to system operators.

LGMPH calls served a need for members of this fledgling organization (begun August 1980) to keep in touch and provide emotional support for one another. The calls have been used as replacements for some face-to-face meetings. They have also provided communication that had not been occurring previously by any medium. LGMPH's group leader indicated that expanded use of the conferencing system by other consumer groups was desirable. The basic roadblock was a way of encouraging use by such truly grass-roots organizations.

DEVELOPMENTAL DISABILITY PROFESSIONALS

I-Team

The first telecommunications user group contacted by project staff in Vermont was a group of DD professionals based at the Center for Developmental Disabilities (University of Vermont) in Burlington. This group, the Vermont State Interdisciplinary Team for Intensive Special Education (I-Team), is composed of six educational specialists and seven core I-Team members from different educational and medical specialties. Project staff collaborated with the I-Team coordinator, as well as the director of the center, to design and implement each of the audio conferencing activities described in this section. Only the first application was initially planned; the latter two evolved later in response to expressed needs.

The I-Team provides technical assistance and training to local school districts in developing effective and appropriate educational programs for severely handicapped students. There are six I-Team regions in the state, each of which is covered by an educational specialist who may spend a significant amount of time traveling to provide services and keep in touch with other team members and consultants at the center.

Because of the highly specialized services provided by the I-Team, the many demands on the team members' time, and the extensive needs of severely and multiply handicapped students, the use of telecommunications was seen as a potentially useful contribution to their work.

In addition to audio conferencing, the project staff also supplied the I-Team with portable videotaping equipment to use in student assessment protocols. Because core I-Team members are often asked by the regional educational specialists to visit a school for observing a child, the I-Team hoped to use the portable videotape unit instead of making on-site visits. Its typical use would be the following: During an initial site visit, an I-Team member or a paraprofessional would tape a child engaging in some specific behavior (e.g., feeding). An I-Team member at the University (e.g., a physical therapist) would view the tape and make a recommendation. Later, the I-Team member would visit the site and verify videotaped observations. School aides would then be given written material and trained in new procedures. This use did not fall strictly within the interactive telecommunications framework; consequently, it was not formally evaluated by the Institute.

Between September 1979 and December 1980, the I-Team participated in 40 telephone conference calls. However, I-Team audio conference usage during the demonstration was quite varied. At various times during that period, they tried three different applications of telecommunications. The overriding goal was to test how telecommunications might be used in furthering the team's mission. More specific goals were associated with the different applications.

The first application took place from November 1979 through March 1980 and involved the I-Team coordinator, three special education teachers, and the educational specialist serving what they call the central region. This group used audio conferencing for the following broad activities:

- Student observation: monitoring student progress on specified programs to determine the need for further on-site I-Team assistance.
- Training: implementing program recommendations, training, and follow-up for classroom teachers and their aides.
- General problem solving: providing collegial assistance for classroom teachers in problem solving.

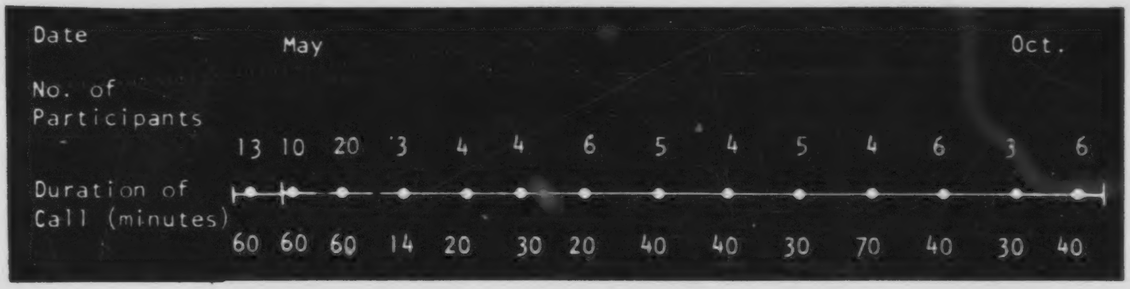
User reactions to the first application were mixed. Half the participants said that they had benefited from the experience, and the other half said it simply consumed their already scarce time. Sharing information in a timely and inexpensive manner was a major reason participants found the experience positive. Some participants criticized the lack of direct benefit to consumers.

Date	Sept.														June
No. of Participants	3	5	5	5	5	5	3	4	7	6	4	3	3	3	6
Duration of Call (minutes)	10	5	30	30	30	32	32	57	30	37	30	15	20	33	60

Among those generally positive about the experience were the regional educational specialist and two consultants who participated in these early conferences. For the educational specialist, the system offered increased contact with local teachers, which resulted in fewer required visits, and a concrete way for teachers to share recommendations and problems. The consultants who participated saw many potential ways the system could facilitate their work. Instead of visiting three or four different training workshops, they were able to "visit" them all simultaneously by telecommunication. One consultant saw a benefit in the system's capacity to generate interest in a future workshop topic. Another consultant saw a main benefit in sharing information quickly and cheaply: "You've got to make changes fast with these kids." The system gave him ongoing, timely communications.

By March, however, it appeared this application had run its course and further use would produce diminishing returns. The close proximity of central region teachers to one another and to other resources detracted from the assumed value of audio conferences.

In May 1980 the I-Team implemented a brief series of audio conferences to expand services to a wider audience of teachers of the multihandicapped. This second application involved four audio conferences (chaired by the I-Team coordinator) on specific topics suggested by teachers of the multiply handicapped throughout the state.*



A total of 19 teachers participated in the four conference calls. Topics included how to control seizures, provide active stimulation, obtain funding, and train parents. Following the sessions, transcripts were made and sent to each of the participants. Included with the transcripts was a brief questionnaire sent by the coordinator. The questionnaire sought the participants' reactions to the conference calls and to the transcripts. Ten participants replied; eight actually participated in one of the sessions. All of the eight made favorable comments on the session (e.g., "informative," "very good") and most thought the transcripts would be useful.

The third audio conferencing application used by the I-Team has proven to be perhaps the most directly useful for team members. Beginning in September 1980 and continuing through this writing, I-Team educational specialists have been participating in regularly scheduled teleconferences three times a month. The calls are chaired by the coordinator in Burlington and include the six educational specialists scattered throughout the state. The calls are used for attending to administrative details of I-Team work, discussion of cases and case management techniques, and collegial support. This group (educational specialists) had been meeting twice a month in Burlington prior to the calls. With audio conferencing, meetings are held once a week via the phone and every fourth week face to face in Burlington. Thus, their face-to-face meeting schedule halved, while their actual contact time doubled.

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*To determine interest in participating in such conferences, the coordinator conducted a statewide survey of teachers working with the multiply handicapped. Of the 21 responses received, most teachers (15) said their contact with their colleagues in the field was "not enough." A third of them said something similar about their level of contact with I-Team members.

Date	Oct.										Dec.
No. of Participants	3	5	5	4	4	3	4	7	5	7	6
Duration of Call (minutes)	20	30	30	50	30	25	20	45	27	50	25

Throughout the 15 months of the demonstration, in addition to these three principal applications, the I-Team used audio conferencing for ad hoc purposes. Objectives of the ad hoc meetings ranged from furthering administrative planning to facilitating case review sessions of teachers, specialists, and parents.

In January 1981, a summative questionnaire covering all I-Team audio conferencing activites was sent to I-Team members. The purpose of the questionnaire was to determine I-Team member reactions to the use of telecommunications in their work and what organizational impact, if any, it had over the course of the entire project. Ten of the 13 I-Team members returned the questionnaire; one was unusable.*

Conclusions

The following conclusions are based on the questionnaire results and additional data collected on I-Team use through the course of the project.

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*See Appendix 1 for raw questionnaire results.

In general, the I-Team gave a "good" rating to the overall experience. The educational specialists who used the system the most rated the experience "good" to "very good."

Supplementing regular face-to-face meetings worked well for team members. Increased contact with colleagues, reduced travel, and regular face-to-face meetings apparently provided the best mix for success.

Expectations of what this sytem could do were exceeded for a majority of the respondents. Given that the I-Team was the first group to become involved in an application and were often subject to technical problems, this finding has added significance. Even after a year of use, the value of the system was perceived as being greater.

Slightly more use could have been made of the system. No respondent thought the system was used "too much." Five members thought the use was "about right," and four thought "too little" use was made of the system. This finding plus additional comments indicate that more uses of the system are emerging and that the group is becoming accustomed to using the technology.

There was a perceived travel reduction pay-off. The educational specialists travel a lot. They perceived a real travel reduction benefit from the use of audio conferencing. All of the ES respondents report some improvement in their travel, and three reported much improvement. One ES wrote, "By decreasing my travel time (in some instances 4 hours of travel for 1 hour of meeting), it has allowed me more time to work in my region."

The system was valued for its ability to facilitate timely solutions to problems. As with travel, there seems to be a common feeling that the I-Team's ability to respond to problems has improved as a result of the use of audio conferencing.

Audio conferencing is perceived as being useful for consulting with parents and teachers. There is some evidence to show that audio conferencing has increased parental involvement with various members of the I-Team. One ES put it this way: "Some parents and professionals have 'met' one another. This might never have happened without the use of the phone." Another educational specialist described a series of audio conferences held with a medical doctor, the parents of a handicapped child, and the specialist. The topic was medication change. "We were able to provide support to parents and get feedback on effects of change quickly. Face-to-face meetings would have meant extensive travel for several relatively short meetings."

Initial student educational assessment is not seen as a useful audio conferencing activity. There seems to be general preference for in-person assessment of a multihandicapped child's problems. I-Team respondents said that visual information is crucial for a proper diagnosis and remediation. Assessing a multihandcapped child's problems has to be done in-person. One respondent, however, mentioned the possibility for using audio conferencing as a follow-up to an initial face-to-face meeting.

(Although the questionnaire did not ask the respondents about the utility of standalone videotape equipment, which the project provided, there was some indication that this application was perceived positively for initial assessment purposes.)

Peer support and encouragement is recognized as a useful product of audio conferencing. In general, I-Team members said the audio conferencing experience was useful for providing support and encouragement. More respondents rated this feature "very useful" than any other. While there might be a tendency to downplay the social function of an audio conferencing link among geographically dispersed specialists in favor of more accepted goals--such as training, information exchange, consultation--users strongly rated the importance of social exchange and support from one another.

Audio conferencing provided more timely and in some cases new opportunities for consultation. The capability of linking resource people, specialists, teachers, and others appears to be recognized as a new mode of operating for I-Team members. As an I-Team physician stated, "It increased my ability to personally communicate medical information to teachers around the state-- much more efficient than driving." According to one educational specialist, "It's a great help to teachers who can have an opportunity to talk with various professionals who otherwise would be unable to consult due to time limitations."

There appears to be an increased sense of team cohesion. This conclusion is admittedly more tentative than others. Yet there are definite signs that over more than a year's involvement with audio conferencing, more and better team communication seems to have taken place with an improved sense of what resources the team has available and how best to make use of them. One educational specialist wrote, "I believe audio conferencing is providing greater consistency of I-Team services to each other as team members and to our consumers. . . . I am generally very skeptical of mass media and computer technology; however, telecommunications has increased team effectiveness, and I suspect we have only scratched the surface."

Visual information is important for a few I-Team tasks, but most respondents felt that audio-only was sufficient to meet most needs. This realization led one educational specialist to conclude that the experience was better than she expected, "I had anticipated that I would feel uncomfortable if I could not see faces to match voices. Although this is still important for some occasions, it rarely was, in fact, a problem for myself and those with whom I was speaking." On the other hand, two respondents cited the lack of visual information as a real limitation. One person wrote, "Audio-visual would greatly enhance the ability to assess a student--both new students and in follow-up, educationally and medically."

There seems to be a strong desire for continued use of audio conferencing in I-Team work. All of the respondents believed that audio conferencing should become an integral part of I-Team work in the future. In addition to fiscal necessity, the reasons cited included less travel, more efficient use of time and equality of service, more links between providers and consumers, and unique consultation opportunities. More than the early I-Team uses, the third phase seems to have cemented audio conferencing in the organizational structure of the I-Team. As such, there is a reliance on this mode of communicating and an expectation that it will continue.

Franklin-North Grande Isle Mental Health Service, Inc.

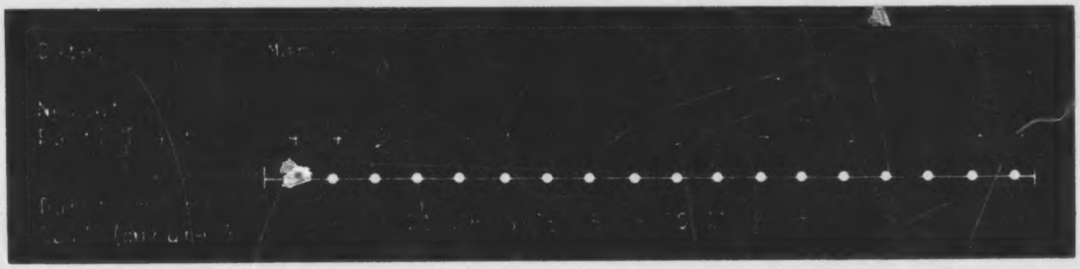
In March 1980, the project team started an audio conferencing application aimed at facilitating service delivery by DD professionals working in rural environments.

The Franklin-North Grande Isle Mental Health Service participated in a number of conference calls with local home-care providers in its rural service area. The group operates a center located in St. Albans. The center is a private, nonprofit group that serves about 120 clients from Franklin and Grande Isle counties. It operates a program that provides training in daily living skills for DD clients.

A significant proportion of deinstitutionalized clients from state institutions began relocating in this rural area about 10 years ago. Although many local residents volunteered to provide them with home care, the training staff at the center does not routinely make on-site visits to obtain data on client behavior at home from care providers. The use of audio conferencing was initiated as a way to encourage more of a continuum of care for clients by establishing regular contact between center staff and home-care providers. The goal was to ensure more consistent practice of living skills at home by the client and to encourage linkages between center staff and the client's primary care providers.

The staff nurse at the center used audio conferencing to establish regular contact with home-care providers. The calls were scheduled on a rotating basis with different groups of participants to coincide with their resident's neurological examinations. The calls informed care providers about what medications their residents were currently taking, the correctly prescribed dosages, and possible side effects. In addition, the calls offered an opportunity for feedback on client behavior at home.

Generally, three to four home-care providers were involved in each conference call with the staff nurse. On average, the calls lasted about 15 minutes. The staff nurse typically discussed each client's case in turn, encouraging all home-care providers to remain on the phone during these sequential one-to-one discussions. Although the format may seem rather formal, the calls themselves were remarkably informal. Most of the participants were on a first-name basis with the staff nurse, and some knew others. Following the case discussion sequences, participants sometimes stayed on the line a few moments to discuss common problems with care provision.



Although the care providers were initially cooperative in agreeing to participate in the calls, by early July 1980 the calls had ceased. It was at this time that the new meet-me bridging system became operational. The system required that participants place a call to the bridge rather than use the previous method of being called by an attendant.

Although subsequent conference calls were scheduled by the staff nurse, none has actually occurred since early July 1980. Her comment was that Vermonters "will do anything you ask, but nothing you demand." She hopes to revive conference calls in the future, perhaps with a return to the previous attendant-calling arrangement.

Conclusions

Calls addressed an unmet need. The conference calls provided a unique opportunity for information exchange between the center staff and client care providers. Prior to use of conference calls, contact between these two groups was sporadic and largely nonexistent. The conference calls provided a forum for exchange of important behavioral information on clients between professional service providers and nonprofessional care providers.

The relatively rigid structure of the calls did not adversely affect their utility. Although the format of the calls was hierarchically structured and encouraged brevity, an enormous amount of information was exchanged. The staff nurse spoke directly with each care provider in turn as the others listened in. Her descriptions of the client's current medical condition, instructions on medication and warnings of possible side effects of the medication were useful to all the participants whose residents might have similar conditions. The feedback from the care providers about client behavior was not only valuable information for the center staff but also allowed care providers to share common problems and perhaps become more knowledgeable about the different methods each had used to cope with problem behaviors. This exchange of information among the providers themselves can be viewed as both a learning and a sharing experience.

Participation of care providers was dependent upon the perceived convenience of the calling procedure. The new mechanism for bridging calls required each participant to place a call to a central site at a prearranged time. This necessitated a greater commitment on the part of the home-care provider, who then had to remember to prearrange time, be available for the discussion, and remember to place the call. Although it may not seem like a very big commitment on their part to call-in rather than wait to be called, it is important to remember that the center has no contractual arrangement with the care providers. Many of them may have participated in the calls simply because of their consideration for the staff nurse who is both well-respected locally and a longtime resident of this area. Also, with the attendant calling arrangement, if the principal care provider were not available, others in her household would fill-in for her during the conference call. (Because of the nature of home-care provision for such residents, it would be extremely rare if no responsible adult were available at the home.) The new call-in arrangement necessitated that a previously identified participant call in at a pre-arranged time. This made participation in the calls more of an exercise in personal initiative.

Other Professional Uses

Other groups of professionals have used the telecommunications services provided by the project. These activities were primarily ad hoc and did not involve groups that were the principal focus of the evaluation efforts. These groups include the following:

Center for Developmental Disabilities

In a spontaneously arising application, a staff member at the University of Vermont Center for Developmental Disabilities used audio conferencing for a series of sessions involving staff at the Brandon Training School, a state mental institution. The conference calls were used to plan, coordinate, and track the progress of a behavior management program for a Brandon resident. A series of eight conference calls was held by this group over an eight-month period (March-October 1980). In addition, a computer conferencing link was established between the University and Brandon for the purpose of data storage and retrieval. The use of these media seemed instrumental in bringing about positive behavior changes.*

The Administrative Policy Committee (APC), which sets overall policy for the center, also used conference calls as an administrative tool for the activities of a number of task groups. Each task group was charged with the development of goal statements in various areas for submission to the APC. Six conference calls were held by these groups during a two-month period (August-September 1980).

DD Law Project

The agency specializes in providing free community-based legal services to Vermont's developmentally disabled population. One conference call (April 1980) was used for a meeting of the project's advisory committee. The purpose of the telephone meeting was to discuss future policies for the agency that required approval by the committee. The convenor of the call indicated that because there was only a brief period in which to make a decision, it was unlikely that committee members would have been able to arrange a face-to-face meeting in time to complete their work.

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*For more detail on this application, see "Team Planning by Teleconference: Developing a Comprehensive Program for a Severely Handicapped Adult," by Edward Sbardellati in User Perspectives, Institute for the Future, July 1981.

STATE AGENCIES

The consumer, community, and professional user groups described previously were all contacted by AMC staff and selected for participation in demonstration activities during the early stages of the project in Vermont. Other user groups, particularly agencies of the state government, asked to become users of the audio conferencing system near the end of the demonstration period. The active participation of these agencies was a step toward more widespread use of the system by others as well as an expansion of the potential funding base for the continuation of services.

Two state agencies, the departments of Mental Health and Vocational Rehabilitation, have become active users of the audio conferencing services implemented under this project. Both groups have a mandate to provide special services to meet the unique needs of the developmentally disabled and to serve a significant proportion of Vermont's DD population.

Because their involvement began late in the demonstration period (when AMC staff were no longer active in developing new uses of telecommunications in Vermont), these agencies were not originally considered specific target groups for evaluation. However, their use of the system, although it began late in the project, is important to note because of its implications for continuation and expansion of the system to other human service groups beyond the initial user groups. Although agency personnel are certainly professionals in their field, they are not grouped with the other DD professionals because of the timing of their participation.

Department of Mental Health

In the fall of 1980, the Vermont Department of Mental Health was developing a five-year operational plan. As part of this development process, the department actively sought input from consumers. They established a special consumer advisory committee to develop policy recommendations for submission to the planning team. A staff intern with the agency was assigned to act as liaison between this committee and the team.

The 15-member committee was made up of people who were either currently served by the department or were former department clients. All had received such services for a minimum of three years, some for as long as 15 years. Initially, the consumer committee held two face-to-face meetings. Attendance was disappointingly low. In October 1980, department officials decided to conduct the consumer advisory meetings by teleconference to minimize travel.

By the end of December, the group had held five telephone meetings, each involving about six participants for approximately an hour. There was generally no prespecified agenda; topics suggested by participants at the start of the meeting were discussed in turn. After each session, meeting notes were typed and circulated to committee members. The committee identified a number of policy issues for submission to the department planning team.

Conclusions

Conference calls contributed to agency policy. As a direct result of the policy recommendations drafted during the conference call sessions, the Department of Mental Health adopted a new agency policy. The calls provided a medium for the consumer committee to draft policy recommendations as a group. The department's planning team accepted these recommendations and they were incorporated into the agency's new five-year plan.

Conference calls served as an informal support network. In addition to drafting policy statements, the group used telephone meetings as a forum for general information exchange and mutual support. They discussed individual issues, such as problems with long-term treatment plans and information on legal services. Several of these participants were also active in patient advocacy groups and have used the calls to share with others their knowledge of resources on patient rights issues. Several committee members also attended an agency administrative hearing to support one of the members regarding recommended changes in her treatment program.

Conference calls facilitated the planning of a special workshop for agency staff. Another significant outgrowth of the calls was the planning of a special workshop for aftercare workers in the department who provide ongoing treatment programs for clients discharged from state mental institutions. The committee was able to enlist prominent client advocacy workers from out of state to make presentations at the workshop.

Participation in calls led to the emergence of another important project user group. The members of this consumer committee and others active in patient rights issues have become regular users of the audio conference system. The experience with audio conferencing as a part of the Department of Mental Health consumer advisory committee led to further use of the conferencing system by a newly formed local advocacy group made up of several consumer committee members. This group, LGMPH, participated in a regular schedule of audio conferences beginning in November 1980. The group had not previously held a regular schedule of face-to-face meetings, so audio conferencing was viewed as an important tool in their early organizational efforts.

Division of Vocational Rehabilitation

The Division of Vocational Rehabilitation's primary purpose is to assist people with handicapping conditions in obtaining gainful employment. This service is performed through the central office and a number of regional units that provide job training, development, and placement assistance, as well as funding for adaptive devices and any other equipment or education that enhances a disabled client's employability. Typically, vocational rehabilitation services become important to DD individuals when they reach adulthood and become ready to enter the job market.

During the spring of 1980, the Division of Vocational Rehabilitation scheduled a series of calls using the local telephone company conference operator. This audio conference use was not part of project activities. In August, the department made a decision to use the conference calling service available through the telecommunications project. This decision came out of discussions with project staff and the participation of the agency director on a project advisory board.

Since August 1980, the agency's Chief of Field Services has been using regularly scheduled conference calls to maintain contact with regional managers at field offices throughout the state. The conference calls focus primarily on administrative topics and general information exchange between field sites and the central office. They have also been used for quickly arranged crisis meetings. In one instance, a conference call replaced a face-to-face meeting that participants could not attend due to weather conditions.

Between August and December 1980, Vocational Rehabilitation staff held eight conference calls, each with an average of five participants and lasting an average of 35 minutes. Several regional managers indicated a preference for regular conference calls to ensure a greater frequency of contact with the central office. Prior to the use of conference calls, this group held monthly face-to-face meetings. Since October, telephone meetings via the conference bridge have been scheduled on a weekly basis.

Conclusions

Use of conference calls increases contact between central office staff and regional field offices. The conference calls have been used to develop a regular schedule of staff meetings among the central office staff and the directors of each regional unit. Meetings are held via telephone each Monday morning to augment the monthly face-to-face meetings.

The regular schedule of conference calls facilitates the provision of information to vocational rehabilitation regional staff. The field services director in the central office indicated that the regularity of conference calls allowed him to reduce written memoranda to field staff, one-to-one phone conversations in which he clarified agency policies, and the number of field trips to regional offices. With each of the field office administrators on-line each Monday, he is assured that each one receives the same information and has the opportunity to ask questions and make suggestions on agency policy as a group. This arrangement helped elicit more direct input from regional staffs on overall agency policy. For example, until recently, the regional managers functioned as both administrators and casework supervisors. An administrative directive in fall 1980 called for the creation of a new position of casework supervisor for each regional office. Prior to frequent conference call meetings, the position description would most likely have been developed entirely by staff in the central office. In this case, the conference call system was used to develop a draft position description with a direct input from field office personnel actually performing these functions daily.

IMPLEMENTATION COSTS: AUDIO CONFERENCING

Equipment and Operation

Basic cost components for this type of telecommunications service include charges for user equipment, transmission, and bridging (use of special equipment to link calls from different sites). During the early stages of project activities in Vermont, project funds for audio conferencing were primarily expended on equipment for users and transmission costs.

Most of the audio conferences conducted during the early stage involved use of telephone company conference calling with calls bridged by the phone company's conference operator. AMC concentrated on testing various types of equipment that allowed for small group use of a single telephone. Various makes of equipment--primarily amplified telephones--were purchased or rented and installed in homes of participants and publicly accessible places. The project picked up costs for participants' long distance calls (transmission and bridging by the telephone company), purchase or rental of the various types of equipment they tried, and installation of special lines.

As usage patterns became more clearly defined during these early calls, AMC shifted its focus toward design and implementation of a system to provide for local bridging capability. A small desk-top bridging mechanism was employed when calls involved five or fewer locations. Calls involving more locations were handled through the commerical conference operator. The desk-top bridge (Telepatcher) was connected to a standard five-button business telephone, so transmission was via normal telephone lines. Using this bridging mechanism, an attendant called each participant in turn and added him to the central conference.

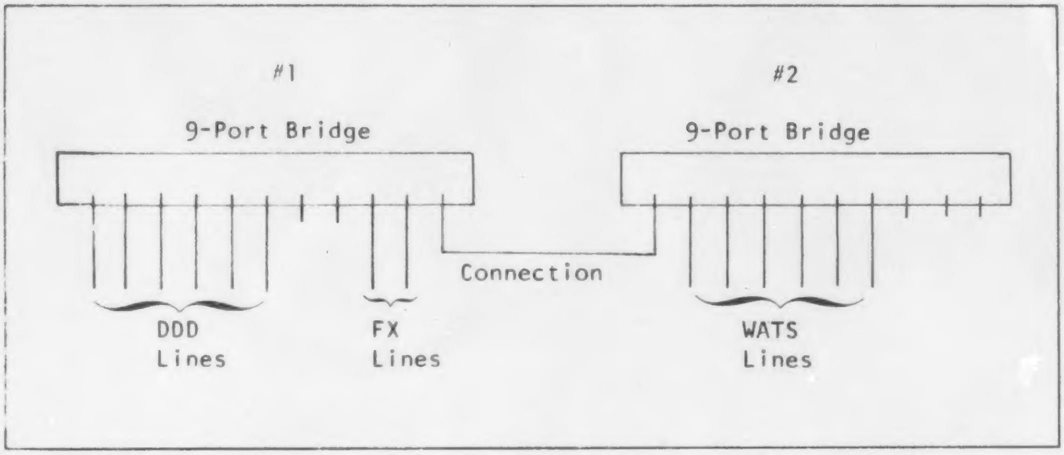
AMC purchased a larger capacity bridging device in June 1980, which was actually two 9-port "meet-me" bridges. A private equipment manufacturer--Telephonic Equipment Corporation, Irvine, California--engineered this device. New England Bell installed it on its own premises in Burlington. Although the bridge uses Bell System lines, Bell does not consider the technology a routine addition. There was a regulatory requirement for a special tariff to allow operation and installation of the bridge on telephone company premises. New England Bell also provided staff for special engineering and continued maintenance services.

The configuration of the telephone lines (number of lines, type of line service) in the meet-me bridge was based on early usage patterns. Six toll-free WATS (Wide Area Telephone Service) lines accommodate callers from distant locations (distant from Burlington, the bridge site) who might otherwise have had to pay long distance charges for their calls to the bridge. Two FX (Foreign eXchange) lines are used to provide toll-free service for callers within the Waterbury-Montpelier-Barrie calling areas. These callers may reach the bridge in Burlington via a local call. At present there are also six local (Burlington) telephone lines into the bridge. Additional capacity can be added to the bridge if needed.

Figure 3 shows the 1981 line configuration of the Vermont Meet-me bridge.*

FIGURE 3

Line Configuration of Meet-Me Bridge


#1
9-Port Bridge
#2
9-Port Bridge
Connection
DDD Lines
FX Lines
WATS Lines

The following list shows costs for the audio conferencing equipment purchased during the initial stages of the project:

Equipment:	
Amplified Telephones	$3,689.13
5-port bridge (Telepatcher)	470.00
meet-me bridge (2)	2,725.00
installation	430.50
	$7,314.63

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*For more detail on line services to the bridge see Paul Rowan's 1981 Audio Conferencing Handbook, Alternate Media Center, NYU School of the Arts and Institute for the Future, February 1981.

The permanently installed meet-me bridge was the principal technological accomplishment of the audio conferencing activities in Vermont. Although the technology itself is not particularly novel, only a handful of such systems are in operation in this country. The only commerical suppliers of meet-me bridging services at the time of the demonstration projects were the Darome Connection, Danbury, Connecticut, and Kellogg Telecommunications, Denver, Colorado. A few Bell System operating companies may have such devices, but their standard conference call service is not handled via this method. The Educational Telephone Network at the University of Wisconsin was a pioneer in the use of this technology, but its meet-me service is not offered commercially.

The fixed monthly costs for this system (at the time of this report) are listed below:

Maintenance	$ 37.00
Security line (for locking and unlocking the bridge)	34.75
Speakerphones (6 monthly rental and 1 private line charges)	86.20
Private phone line for administrative assistant	30.00
WATS lines (6 @ $150.00)	900.00
Local lines (6 @ $14.75)	88.50
FX lines (2 @ $130.20)	260.40
WATS overtime ($11.75 per hour; 36 hours)	423.00
Rent/Office supplies	65.00
Total Monthly Costs:	$1,924.85

Staff time estimates per month include a full-time administrative assistant and a part-time system manager, which total an average of 6.1 person-weeks.

The affordablility of the audio conferencing services depends to a great extent on how its costs compare to costs for travel or other electronic media to allow the group to communicate. Aside from the costs of implementing such services, the question still remains as to whether one could reasonably afford to access and use them once they are in place. The following case study may be useful in providing some perspective on the affordability question. The case study is based on an actual audio conference that took place during the demonstration period.

Case Study:

Situation:

Probable meeting site: Waterbury, Vermont

No. of Participants: 5

Location of Participants: Huntington
Essex Junction
Montpelier
Rutland
Woodstock

Duration of meeting: 1 hour

Option 1: Face-to-face meeting in Waterbury

Locations of Participants	Approx. Roundtrip Mileage to Waterbury
Huntington	30 miles
Essex Junction	52 miles
Montpelier	30 miles
Rutland	140 miles
Woodstock	124 miles
Total Mileage	376 miles

At 24¢ per mile, travel costs = $90.24

(Additional expenses might include personnel time lost in traveling, rental of a meeting site, and food.)

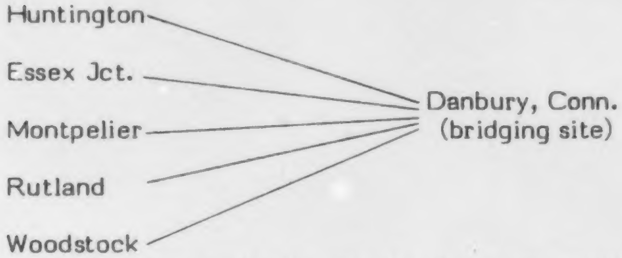
Option 2: Bell System Conference Call Services

Total costs for this service include charges for the first 3 minutes of the call (initial period) plus a per-minute rate for additional time.

Costs for the first three minutes are based on the person-to-person charge for the two sites that are farthest apart (Woodstock and Essex Junction), plus a charge for each additional location.

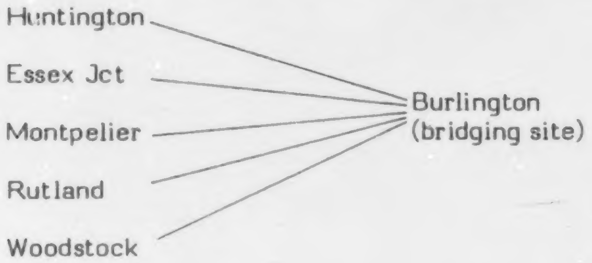
Initial Period = $2.60 + (3 x 2.00) =	$ 8.60
Each additional minute @ $1.75 =	99.75
Total Costs	$108.35

Option 3: Commerical Meet-me Bridging Service*


Huntington
Essex Jct.
Montpelier
Rutland
Woodstock
Danbury, Conn.
(bridging site)

Five direct-dial (daytime) calls to the bridging site =	$ 90.70
Bridging charges (.333 @ min/site) =	99.90
Total	$190.60

Option 4: Vermont Meet-me Bridging Service (Vermont Telecommunications, Inc.)


Huntington
Essex Jct
Montpelier
Rutland
Woodstock
Burlington
(bridging site)

(Five toll-free calls to the bridging site)

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*Costs based on current rates for the Darome Connection (Danbury, Conn.) which Vermont callers would most probably use to avoid the added expense of a cross-country call to the other commercial service, Kellogg Telecommunications (Denver, Colorado).

Costs are based on a fixed per-hour fee regardless of the number (14 lines currently available) of callers or their locations. Calls originating outside Vermont would use a local (Burlington) phone number and be subject to interstate tolls.

Current Rates[*]:

User Type		Per-hour Charge
Category I:	Commercial Users	$ 120.00
	(with contractural arrangement for a minimum number of sessions)	100.00
Category II:	Government, Nonprofit or Educational Users	75.00
	(with contractual arrangements)	60.00
Category III	Government, Nonprofit, or Educational Users with mandate to serve the handicapped	60.00
	(contractual arrangement)	30.00
Category IV:	Nonprofit Users (Consumer and Community groups)	FREE

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[*] These rates were provisional at the time of this report, awaiting approval by the VTI board. Rates apply to sessions with most calls originating within the state of Vermont. Variable rates are available for sessions where the majority of the calls originate out of state.

Personnel Time

During the project activities in Vermont, a full-time site manager was present from July 1979 to October 1980. To assist with scheduling, coordination, and clerical support, a full-time administrative assistant was also on-site. Other project staff from New York, including the project leader and technical assistants, worked with the site manager. Although local people were also involved in various aspects of the development and administration of certain applications, their personnel time commitments are not listed here.

The following are rough estimates of levels of effort expended by project personnel in developing and implementing audio conferencing activities in Vermont.[*] These levels of effort are given in the number of "person-weeks," assuming the benchmark number of 4.33 person-weeks per month of full-time effort.

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[*] This discussion of personnel time is limited to staff directly involved in the implementation of project activities. The time expended by outside consultants, the evaluation team, and participants is excluded.

Development and Implementation: July 1979-May 1980

Professional applications Principal personnel: Project leader Site manager	10 person-weeks
Consumer applications Principal personnel: Project leader Site manager	35 person-weeks
Equipment Design and Implementation Principal personnel Technical assistant	20 person-weeks
Organization and management Principal personnel: Project leader Site manager Administrative assistant	83 person-weeks
User training Principal personnel: Technical assistant	5 person-weeks

CONCLUSIONS: AUDIO CONFERENCING

During our data collection period, more than 150 hours of audio conferencing were logged by the different user groups. Telephone conferencing activities received more project attention and involved more local participants than any other aspect of the project. Thus, it is helpful to look at some of the broad conclusions drawn from the experience:

Audio conferencing was favorably received by most groups. There were neither glowing success stories nor complete failures in the use of this technology. The general reaction toward the experience was a postive one, perhaps a rating somewhere between 2 and 3 on a 5-point scale (1 is very positive, 5 is very negative).

Audio conferencing made it relatively easy for some group members to participate in a meeting. The travel constraints prevalent in the region were less of a factor in a group's ability to assemble its members for a meeting. A big factor mentioned by one group leader was that the conference calls allowed participation by key actors who might not have been able to participate otherwise. The convenience of holding such meetings, however, raises the issue of whether more meetings were held than were actually required by a group. Typically, more meetings generate more work. There is a risk that the ability to hold meetings easily with key people involved will add to an organization's workload.

Three different meeting styles emerged, none predominated. Even within groups, meeting styles, topical content of the call, and the number of participants varied with different leaders.

A content analysis of the audio tapes of 32 meetings* held over the course of the demonstration revealed three different meeting styles prevalent among audio conferencing user groups: the presentation, the structural discussion, and the informal discussion. Table 2 shows a brief description of each of these meeting styles. In a qualitative sense, even those meetings that could be classified as having similar styles were often quite different in tone, although the formats were essentially the same. The difference in tone seemed to be related to the personality and style of the group leader more than any other single factor.**

Although general information exchange was the predominant purpose for convening most of these meetings, some involved more complex tasks, such as problem solving (e.g., group identification of courses of action, case consultation) and decision making (e.g., finalizing drafts of policy statements and organizational by-laws).

Audio conferencing boosts parental involvement in DD decision making. Parents of DD children have a great deal to say to one another and have a high need for contact with service providers. A number of groups were able to tap into these needs and facilitate parents talking to one another and to professionals working in the field. There were instances of special meetings arranged electronically to connect parents of a DD child with a teacher and a specialist in different locations. Both in terms

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*See Appendix 3 for a description of the methodology used for this content analysis as well as the resulting information used to classify the meetings.

**A more comprehensive content analysis of 30 audio conferences held early in the project (November 1979-March 1980) was performed by John Carey of the Alternate Media Center. In this paper, the author outlines five descriptive models of information flow and identifies several interaction characteristics associated with each. This information may be very useful to those readers interested in the organizational aspects of audio conferencing, particularly the role of the moderator and certain widely accepted notions regarding the necessity for use of a prescribed agenda. Interested readers can consult Carey's "Interaction Patterns in Audio Teleconferencing," (unpublished article), Alternate Media Center, NYU School of the Arts, March 1981.

TABLE 2
Meeting Descriptions

	Agenda	Meeting Start	Presentation	Question/Answer Period	Prompting	Participant Interaction	Supporting Model
The Presentation Typical groups: Parents VARC VSPP VCIL Franklin Co.	Pre-set	Signalled by leader with agenda	Made by outside guest speaker or leader. Generally didactic with information presentation	Follows presentation. Leader often rollcalls to elicit questions and comments	Majority of prompts made by leader. Leader takes responsibility for maintaining discussion and changing topics	Comments made largely to leader or speaker. Few, if any, participant-to-participant comments. Number of topical utterances by participants is low. Little, if any, social commentary (weather, health of participants)	Resource materials (e.g., copies of by-laws or legislative programs, agency directives) sometimes available to be referred to by participants during the meeting
The Structured Discussion Typical groups: Voc. Rehab. Mental Health VSPP VARC DD Council I-Team UCP	General structure is pre-set, but full agenda is prepared on-line with input from participants	Signalled by leader with requests for additional agenda items	Generally made by leader or designated participant. Typically covers specifics of topics familiar to participants	No structured question/answer period. Presentation can be interrupted by questions and comments from participants	Leader may or may not make majority of prompts, but leader does take responsibility for topic changes. Participants prompt one another freely	Some comments directed solely to the leader, but participants interact freely with one another. Number of utterances by participants medium to high. Typically some social commentary prior to start of meeting or at close	Resource materials sometimes available
The Informal Discussion Typical groups: LGMPH I-Team UDPV	Largely unstructured	Meeting begins whenever two or more participants are on-line	No formal presentations made	No formal question/answer period	Leader does not make any more prompts than other participants. Participants do not defer to leader the responsibility for maintaining the discussion or changing topics	No deference to leader in making comments. Participants speak freely with one another. Number of topical utterances by participants is high. Social commentary is not separate from other meeting topics	No resource materials available

of parent involvement in advocacy activities for generic issues and for specific problems related to their child, new communication opportunities were tested and found to be useful new tools.

Audio conferencing proved to be an efficient administrative tool for groups with distant affiliates. For both professional use and for consumer and advocacy use, audio conferencing achieved high marks for helping organizations stay in touch with branch or regional units. It seemed to garner especially high marks for planning and other committee activities.

In general, group leaders perceived the audio conferences as focused and businesslike. The time constraints of using the medium encouraged more focus on getting tasks accomplished. In most cases there was a prescribed time limit on the calls as well as the natural limits of how long participants could hold receivers or maintain their concentration without visual cues for reference. However, this also implies a need to control the discussion flow. One application involving a highly structured format with strong leadership control was abandoned largely because such a format did not fit well with the leader's styles.

Large group conference calls proved difficult to manage. The joint conference calls with the Surrogate Parent Program and the Vermont Association for Retarded Citizens proved too cumbersome to use and were discontinued. The two groups, however, continued to use the service individually. The lesson here is that large group meetings require more preparation and leadership skills than do smaller group sessions. While there is no ready formula, the experience of this project suggests that regular conferences involving more than 12 locations run a risk of frustrating participants unless there is a high need and good preparatory work.

Providing a toll-free service made it easy for group members to participate. Not having toll-free lines would burden users with keeping track of their long-distance charges at a later time. The method selected for Vermont where users can access the network without incurring any charges seems to have met with favorable reaction from the users. No undue administrative burden was placed on any agency. No record keeping was required of individual callers. The one user-group charge covered everything. Clearly, there were no user barriers from the billing mechanism.

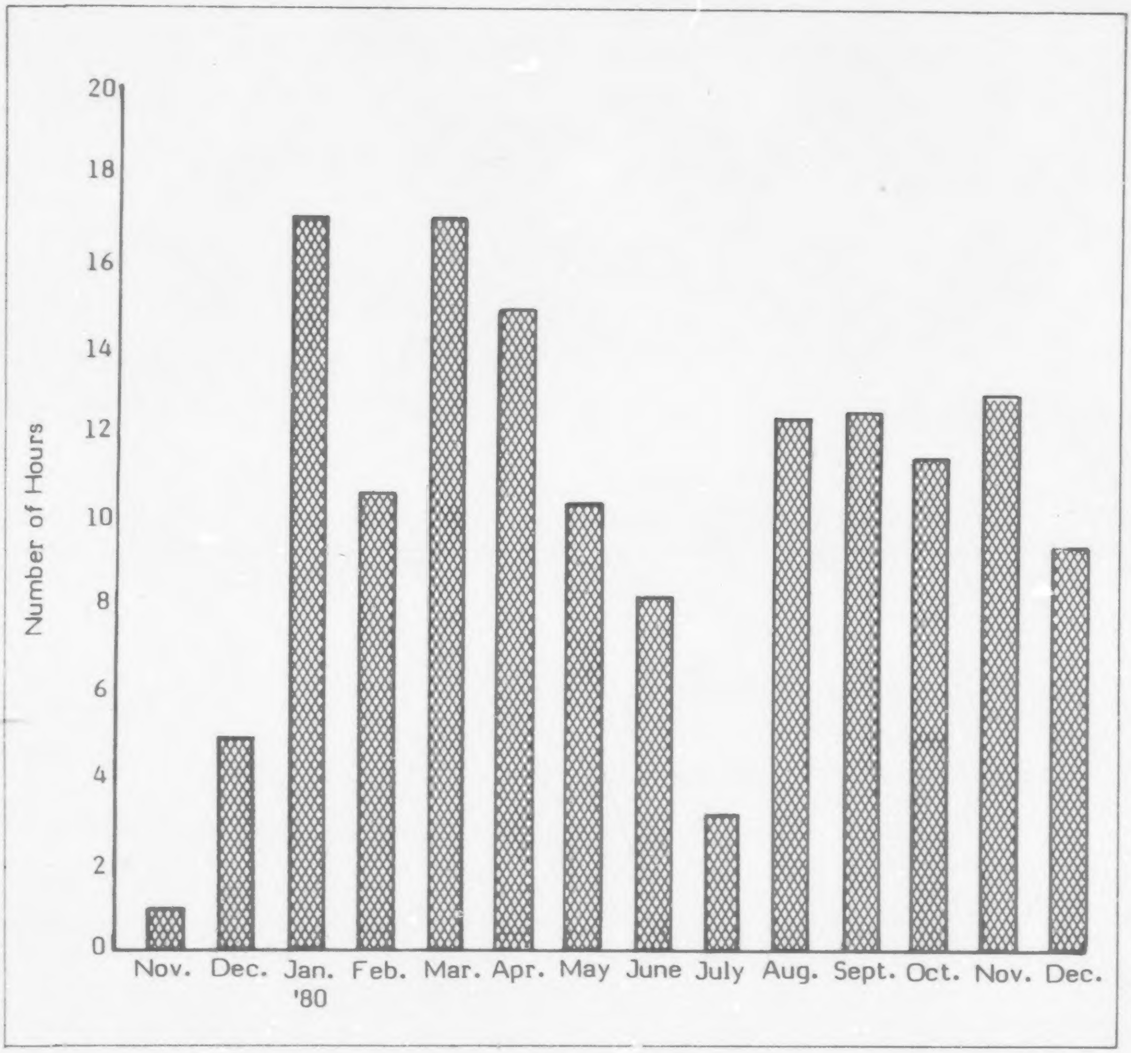
Most users preferred the meet-me (dial-in) bridging service. Although there were users who expressed a preference for being called by an operator for a conference, the majority had no difficulty using the "meet-me" service. Questionnaire responses with selected groups showed that most users who were given a choice preferred the dial-in service to being called by an operator.

Although equipment costs were modest, personnel time for development and initial implementation was considerable. Expenditures for audio conferencing equipment were reasonably modest and are likely to be even less costly for similar groups considering such usage because extensive experimentation prior to implementation may not be necessary. Personnel costs, however, were high. A total of nearly three person-years of effort was expended in organizing the various audio conferencing applications. Although much of this time was spent in initial identification of likely user groups, a significant portion involved equipment design and testing as well as day-to-day system management and operation.

Exclusive use by DD organizations does not appear to be sufficient to sustain bridge operation; additional users are needed. After the installation of the meet-me bridge, audio conference usage leveled off during the data collection period (see Figure 4). Since that time, usage has increased at a slow but steady pace, according to Vermont Telecommunications, Inc. This increase, however, is still not sufficient to maintain

FIGURE 4

Audio Conferencing Usage



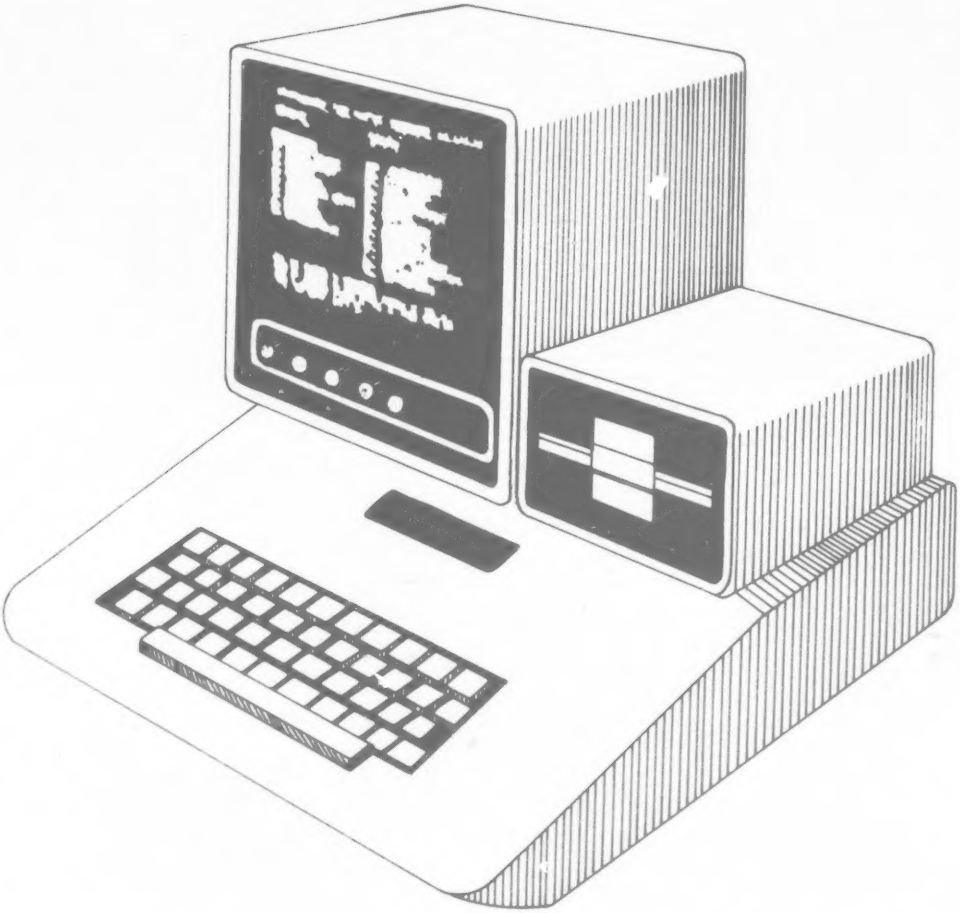
AMC installed and tested the meet-me bridge during June and July, 1980.

the service based upon exclusive use by DD groups. Other human service agencies and even commercial organizations need to be recruited if a solid core of user organizations is to be established.

A critical mass of users is needed if the bridging service is to do more than merely operate the bridge. Training, marketing, and program development are critical services for this fledgling telecommunications organization, just as they were for the project team. It takes added financial resources to be able to provide such services. To get additional resources, VTI needs more users. The agency has recognized this need and has been developing marketing strategies to meet it.

The lesson for other DD organizations interested in beginning such services might be to broaden the initial pool of potential users to include other human service and related groups.

Chapter II:
Personal Computers



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PERSONAL COMPUTERS

Most of the activities in Vermont were oriented toward DD service providers [illegible]epresentatives of local advocacy groups. The demonstration of personal computers was different. It focused on how DD people themselves might directly access and use computers for their own enrichment, at their own pace.

Beginning in April 1980, project staff installed Apple computers in the homes of eight developmentally disabled people living in and around Burlington. Working with a local advocacy group (United Cerebral Palsy of Vermont),* a diverse group of participants was identified: a budding adolescent who enjoys camping out and operating the machinery used in his parent's large garden, a young college graduate active in local advocacy groups, a young man preparing to enter college, two teenage girls, a young woman finishing high school, and two single adults. They all possessed varying degrees of mobility impairment due to cerebral palsy.

The computers were commercially available for about $1,000 and require the addition of a disk drive and a small black-and-white television monitor. Some of the computers were installed as they came out of the boxes; others were modified to the special physical needs of individual users. The computers were chosen because they provided an opportunity for both educational and vocational enrichment as well as possibilities for expanding communication. With the addition of a modem (a device for connecting a computer to an ordinary phone line), these personal computers became communication devices as well as stand-alone home computers. This feature allowed participants to communicate with one another and with the tutors.

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*At the end of the demonstration period, ownership of the equipment used during the application was transferred by AMC to Vermont Telecommunications, Inc. (See Chapter 4). However, financial responsibility for continuation after June 1981, as well as organizational supervision, is being provided by United Cerebral Palsy of Vermont.

AMC held two informal meetings for interested persons in the fall of 1979. After discussing their early plans for this activity, they invited those interested to try using two computer terminals, which were available at the second meeting. Eight participants for the demonstration were subsequently chosen. The user group was intentionally kept small due to the expense of the equipment and the desire to insure individualized orientation and instruction.*

Once the participants had been identified, both a tutor and an adaptive devices designer worked individually with each of them during the installation of the equipment. Some dexterity is required to operate the machines: Users must place disks (the size of small phonograph records) in appropriate slots and depress keys on a typewriterlike keyboard. The equipment for most participants required simple modifications, such as gauging the most comfortable angle for access to the keyboard and disk drives. The keyboard of one of the most severely impaired participants required a specially designed template, or overlay, to prevent multiple key depressions. A special platform was constructed to mount the computer terminal at an appropriate angle, and handles were attached to the disks for easier insertion. To depress the keys, this participant used a dowel. These and other modifications were individually designed and implemented.

The principal coordinator for the group, Jim Schumacher, is a computer engineer. During the early spring of 1980, he was granted a six-week community service leave by his employer (IBM, Burlington, Vermont), which he extended to eight weeks by taking vacation hours, to work full-time to help launch this application.

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*For a fuller discussion of the planning for this application, see "Building a New Partnership: Microcomputers and the Handicapped," Pat Quarles and Red Burns, Alternate Media Center, 1981.

The early focus of the application was to orient users to the equipment and to explore various system capabilities. When AMC selected the program materials, they had three goals:

- expand interpersonal communication
- identify vocational interest
- provide educational experiences.

The program materials included games, computer programming instructions, interpersonal exchanges using a "bulletin board" message system, and programs for practical activities, such as household inventories, directory files, and budget planning.

Initially, games received heavy emphasis as a way of familiarizing participants with the equipment. Later, some games offered opportunities for increased interaction among the participants. Users arranged two-party computer sessions for playing certain games with the tutors and one another via telephone hook-ups. During this period, aided by his teenage son, the coordinator provided individualized instruction for participants in their homes.

As the participants progressed, remote tutoring through the system became more commonplace. The remote tutoring involved the same computer-to-computer connections via telephone lines as the game sessions. Instructions to users were delivered interactively in the form of messages printed on the participant's screen. Using this approach, the tutor could remotely monitor the participants as they carried out each instruction.

By the fall of 1980, two additional tutors provided instruction to participants. One was a student at the University of Vermont; the other was a local resident with computer expertise, who volunteered several hours a week to tutor the two youngest participants. During this time, AMC organized program materials into a more structured format based upon the progress of participants and their goals for this application of telecommunications.

Early progress in learning to use the computers was not as rapid as the tutors had originally anticipated. Adolescents found it particularly difficult during the early spring of 1980 to take time away from their schoolwork to use the computers. (The beginning of this application coincided with the end of their school year.) Because of impairments in coordination, some of them required a great deal of time to insure that their homework assignments were not only correct but legible. But by the end of the year, progress among all participants was evident and encouraging.

AMC organized program materials into two primary categories, vocational and educational. Although all activities involved learning basic programming skills, different computer capabilities were explored in these two areas. In addition, expansion of interpersonal communication was encouraged among participants by use of a computer message system ("bulletin board").

Vocational Activities

The tutors paid particular attention to vocational activities over the last six to eight months (late fall 1980 through early spring 1981). There was no intent that participants would become sophisticated computer programmers, but vocational opportunities for these participants could be enhanced by skills developed in this demonstration.

The tutors devoted time to identifying program materials and designing assignments that addressed vocational interests, such as typing and bookkeeping. Tutors also introduced more complex programs that taught small business inventory, calculating amortization schedules, and loan tables. In addition, all participants gained experience programming card files and mailing lists for local groups. One of the adult participants is currently employed full time as a nurse's aide, but is interested in possibly changing careers. She acquired computer skills and hopes eventually to becomea bookkeeper. Her experience with home computers should help. In the opinion of his tutors, the most severely handicapped adult participant demonstrated enthusiasm, initiative, and acceptance of responsibility, which may improve his employability.

Educational Activities

The tutors designed and implemented educational activities primarily with younger participants who were still attending school. They attend public schools and exhibit varying degrees of difficulty keeping pace with the other students. A significant overall benefit for these participants was the increase in individual attention and encouragement provided by the home computer tutors.

Not only did tutors attempt to teach computer programming and operational skills, but also they related those skills to the student's regular classwork. They paid special attention to tutoring in math as well as computer skills. They offered programs to tutor math and, for one participant, developed special "scratchpad" software with an electronic "blackboard" for ease in making calculations.

An example from early in the demonstration illustrates the success of the tutoring activity. One participant who barely managed to pass first-year algebra was advised not to attempt the next course. But with the special tutoring and the added ability to demonstrate her grasp of algebraic concepts more fully, which studying computer programming had provided, she took the second course and completed it with a B.

Another participant showed learning capabilities that were not evident at the beginning of the demonstration. Although initally slow to grasp programming concepts, she made remarkable progress over the last few months of the demonstration. The tutors now report that she is one of the most adept and creative home-computer users among the participants. Her progress seems directly related to the individual attention provided by one of the tutors. When it was confirmed that she has visual as well as mobility impairment, instructional materials were developed for her special needs. In addition, the tutors encouraged and coached her immediate family, particularly her father, in tutoring techniques to develop her skills.

Real-life, practical applications of home computers have been the most successful among younger participants, whose impairments make completing homework assignments tedious, difficult, and time-consuming. With computers, production time for assignments was reduced by the use of word-processing software. Participants type homework assignments at computer keyboards with television screens that permit lightning-fast corrections. Then, by storing the assignments on disks, they can easily obtain printed copies to take to school. The time and trouble saved leaves students with more time to consider and check their work.

Other needs of younger participants were addressed. A teenage girl wanted to keep a diary, but her writing difficulties had made it impossible: She was unable to decipher what she laboriously wrote. A special program was developed to allow her to make diary entries, store them, and recall them for review. The program also satisfied a principal requirement for any diary--secrecy. She was the only one in her home who knew how to use the program.

Communication: The Bulletin Board

The bulletin board system, a software package, provides a source of information on typical participant activities, as well as a record of interactions (written messages) among group members. From home terminals, users access a central computer via telephone lines. The system addresses, dates, stores, retrieves, and displays messages in a central file available to all participants (and other callers with appropriate accessing equipment).* The system is currently accessible on a 24-hour basis and can be used interactively for synchronous (real-time) message exchange.

In number of log-ins (log-ins refer to the number of times a user accesses the system), the figure below shows the levels of use of the system over a nine-month period beginning June 1980. (Log-in records for May 1980, the first month of bulletin board operation, are incomplete.)

The bulletin board was used principally as a central "meeting place" where users could arrange and verify appointments with tutors, report equipment problems, and engage in social dialogue. Although the system was accessible to other home computer users, interactions with users outside this group typically involved message exchanges between the tutor and outside users wishing to know more about the system and the participants using it. In addition to access by other home computer users, other telecommunications project staff--from the Alternate Media Center--were active system users during the early months of system operation.

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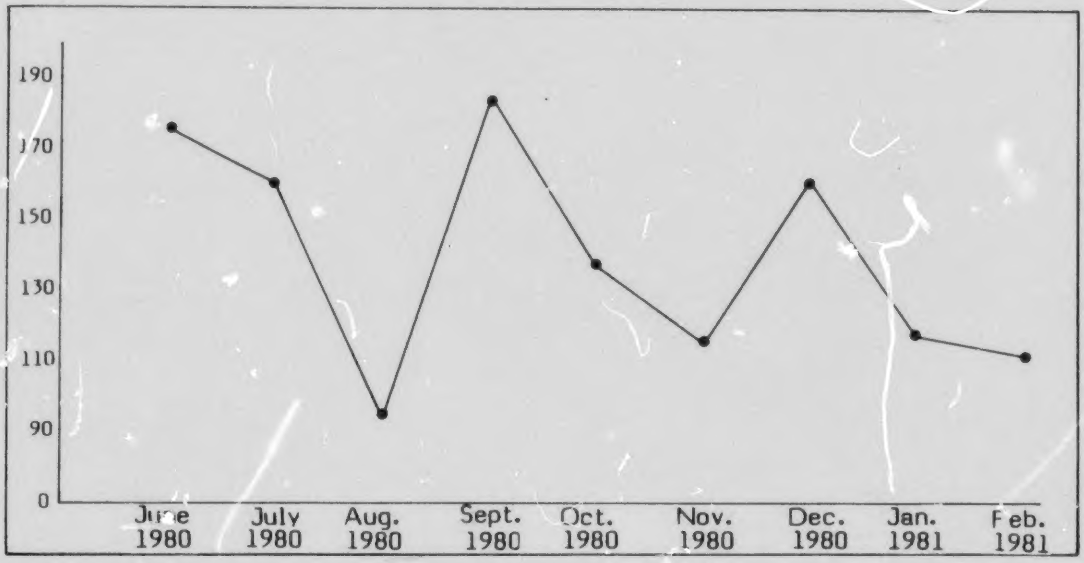
*Many groups of home computer users around the country operate bulletin board systems.

FIGURE 5

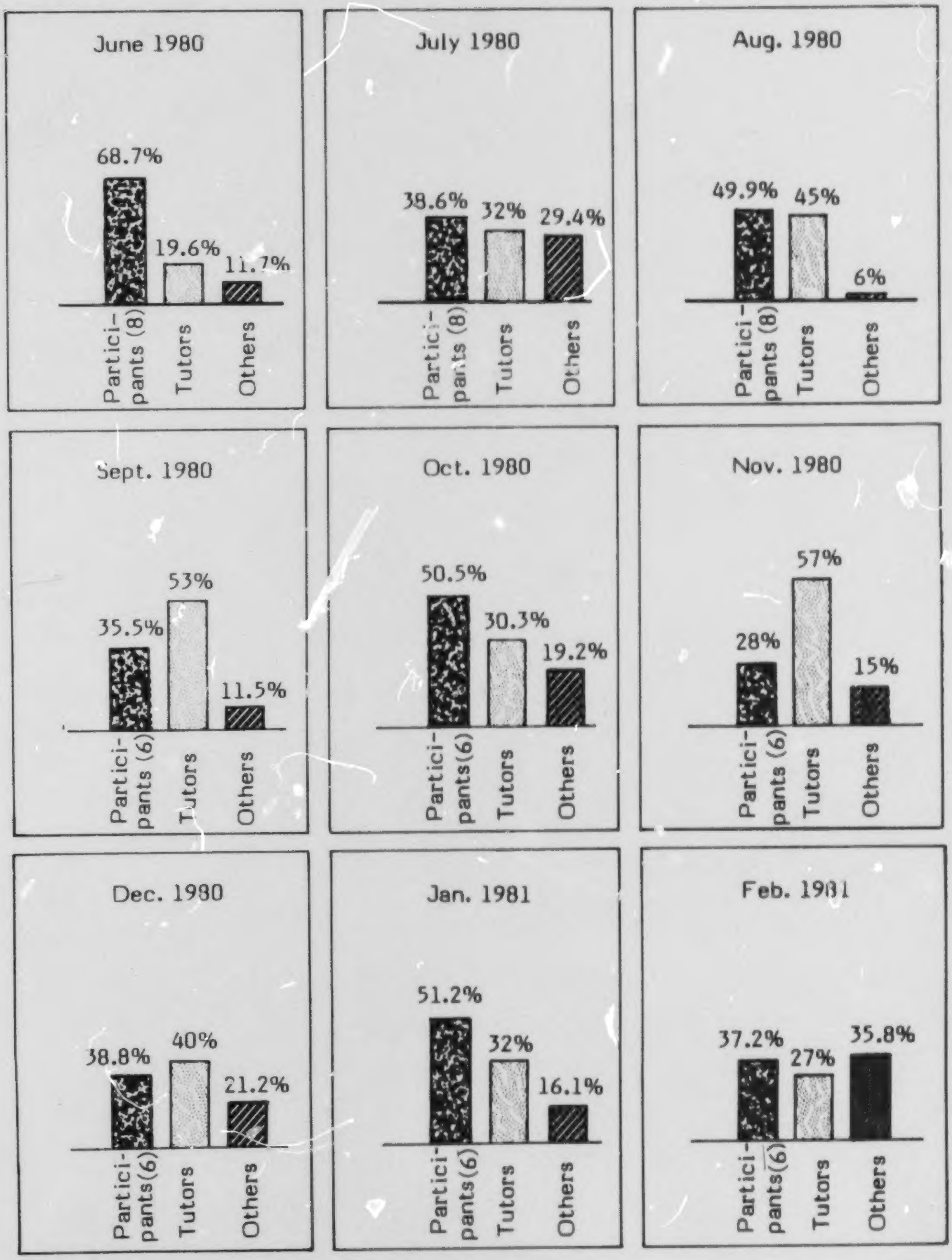
Bulletin Board Log-Ins



In general, log-ins to the bulletin board averaged about 140 per month (5 per day) over a nine-month period. Figure 6 shows proportionate log-ins for the participants, tutors, and other users after June 1980.

FIGURE 6

Proportionate Bulletin Board Log-Ins



Content analysis of bulletin board messages

The Institute conducted a limited content analysis of bulletin board messages. Two two-month periods at the beginning of the activity and seven months later were selected for analysis.* The following descriptive categories were used for coding each line of text contained in bulletin board messages exchanged among participants during the two periods:

(0) Introductory exchanges or initial greetings directed to particular participants or the group as a whole

(1) Social exchanges

(2) Instructional exchanges (e.g., tips on system use)

(3) Procedural exchanges relating to overall administrative details, such as scheduling appointments for tutoring or equipment checks

(4) Inducements to elicit more active use of the system (e.g., input of riddles or questions for feedback from users)

(5) Requests for assistance with system operation, access, or equipment

(6) Feedback/assessment of the system or individual accomplishments with system use.

During the first period, 611 lines of text were analyzed, and 517 lines were analyzed during the second period. The following figure summarizes the text analysis:

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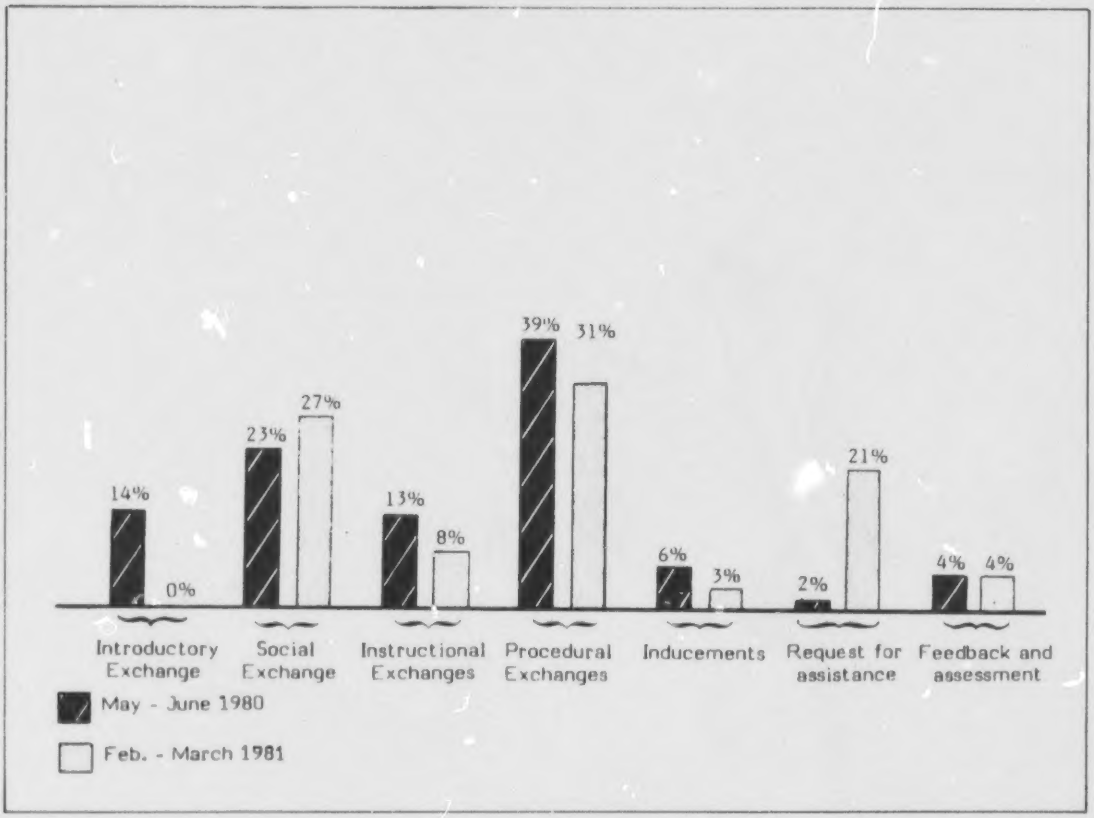
*These periods were selected in order to obtain a manageable sample of messages at different stages of the activity. See Appendix 4 for a complete chart of content analysis results.

FIGURE 7

Bulletin Board Text Analysis



The breakdown according to categories shows significant changes over the two periods in only two categories: introductory exchanges (0) and requests for assistance (5).

As might be expected, the earlier period showed a significant proportion of text that involved initial introductions. The users were just beginning to use the system and to know one another. By the second period, this category of text was not evident.*

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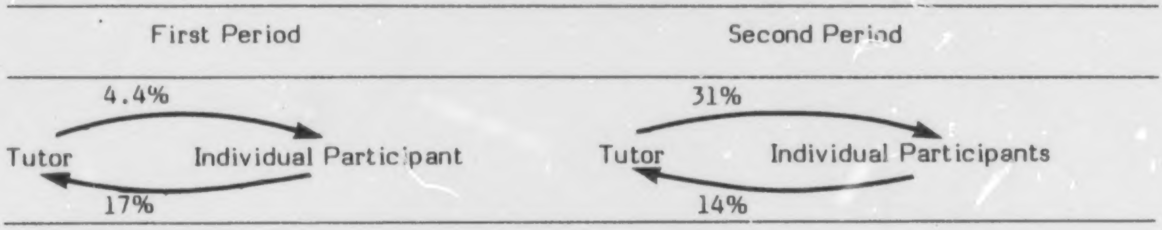
*Although new users (outside the demonstration group) did join the bulletin board system during the seven-month interval between the two periods covered by the analysis, none joined during the second analysis period.

One hypothesis regarding the increase in requests for assistance (from 2 percent to 21 percent) may be that as the participants became more familiar with the home computers they were in a better position to ask more in-depth questions about their operation. Too, it might be assumed that their close working relationship with the tutors over the course of the activity resulted in fewer inhibitions about asking for help.

In addition to text analysis, the Institute gave attention to the directionality of the communication flow among bulletin board users and possible network configurations among participants. During both periods, the bulk of entries (lines of text) related to exchanges between the tutors and individual participants.

Directionality of Messages among Tutors
and Individual Participants



Although AMC envisioned the bulletin board as a medium for the possible expansion of communication among the participants, there was little evidence of this occurring. Although there was some initial activity along these lines during the first period (participant to participant exchanges, or participant messages directed to all users), such exchanges had all but disappeared by the second period.*

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*It should be noted, however, that this diagram refers to "public" messages via the bulletin board system only. More private computer-to-computer hook-ups were also possible and frequently used by participants for playing games together or exchanging computer programs. Written transcripts of such exchanges were not recorded.

Directionality of Messages
Sent by CP Participants

First Period			Second Period		
Participant →	4.4%	Participant	Participant →	0%	Participant
Participant →	3.4%	Entire Group	Participant →	.2%	Entire Group

Individual participant interaction with bulletin board callers outside their original user group was largely nonexistent. Although other users made some attempt to draw out participants (by leaving introductory messages) during the first period, their entries went unanswered. The second period shows no communication at all among these two groups.

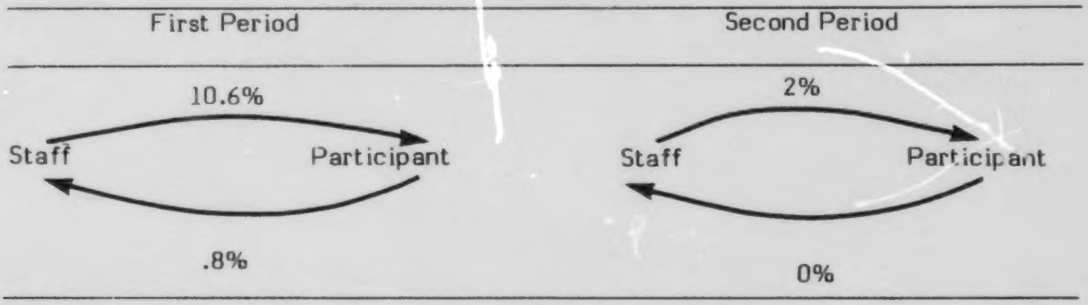
Directionality of Messages among
CP Participants and Outside Users

First Period		Second Period	
Participants → Outside Users	0%	Participants → Outside Users	0%
Outside Users → Participants	1.6%	Outside Users → Participants	0%

There is evidence that some message exchange occurred between other users and these participants during the seven-month interval between these two periods. These exchanges, however, were minimal. One explanation may be that the outside users, who for the most part were much more sophisticated home computer users, found little common ground with novice users. Notably, most of the outside users directed their entries to the tutor.

Although project staff other than the tutors frequently directed entries to individual participants early in the demonstration, participant replies were scarce. To an even greater extent, that was also true during the second period, when staff entries declined due to the return (October 1980) of AMC staff to New York.

Directionality of Messages between
CP Participants and Project Staff



First Period

Second Period

It is evident that the bulletin board functioned largely as an administrative tool for coordination of activities among participants and tutors. Procedural entries dominated the exchanges accounting for more than a third of all entries during both periods. Social exchanges ran a close second (23 percent, first period; 27 percent, second period), but primarily involved tutor/participant interactions. The vision of a fully interactive communications forum for users had not materialized at the end of the data collection period.

IMPLEMENTATION COSTS

Equipment

The use of personal computers by multihandicapped adolescents and adults involved a significant initial investment in equipment and program materials. Each of the participants required a full compliment of basic equipment: computer, television monitor, computer storage disks, disk drives. In order to set up a system for handling the bulletin board exchanges and systems for use by the tutors, it was necessary to purchase additional complete units.

Following is a list of costs for equipment and program materials purchased during the initial implementation of this application:

Basic equipment:

Computers (11 @ $999.00)	$10,989.00
Television monitors (9 @ $283.00)	2,547.00
Auxiliary memory/cards	4,150.00
Disk drives	5,976.00
Disks	945.00
Cables/cases/warranties	808.55
Micromodems	3,835.00
Software	427.95
Printers and auxiliary equipment	2,438.00
9 Private phone lines (installation)	401.47*
	$32,527.97

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*Typical charges for maintenance of these lines averaged about $100 per month.

Personnel Time:

A significant amount of the staff time listed under "overall organization and management"* of the audio conferencing applications includes development of the personal computer training. This activity was envisioned during the early weeks of AMC's work in Vermont. The lead-time necessary to begin actual personal computer usage was significant. In addition to identifying users, equipment had to be selected and ordered, tutors had to be identified, and adaptations made to the equipment.

The approximate staff time expended in these activities from July 1979 to May 1980 is listed below:

Principal personnel:	26 Person-weeks
Project leader Site manager Tutors (2) Adaptive devices designer	

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*See Chapter 1, Implementation Costs.

CONCLUSIONS

Learning to use the computers took longer than the tutor(s) expected. Early in the demonstration, the tutors realized that teaching users to understand computer operation and programming skills took time. Younger participants experienced time constraints due to conflicts with end-of-school-year assignments; older participants had initial problems grasping computer concepts. To better accommodete the users' skill levels, program materials had to be revised. In one case, a user had a previously undetected visual impairment that necessitated a different tutoring approach.

The computers were easily adapted to the special needs of these users. An adaptive devices designer worked with each participant in making modifications to the equipment. Typically, only relatively simple modifications (e.g., mounting the keyboards at various angles and adding templates to prevent multiple key depressions) were required for most participants to use the equipment comfortably.

Individual tutoring was a principal factor in participant progress. One-to-one tutoring sessions at participants' homes appears to have encouraged individual effort. Although program materials were largely standardized, participants were encouraged to progress at their own pace and not to compete with other group members. The dramatic progress shown by the participant with a visual impairment was directly attributable to a tutor's increased attention and personalized revision of program materials. Tutors said that the one-to-one sessions were often viewed by participants as social occasions, which may have provided additional incentives for individual effort. Also, the advantage of peer group contact provided by one tutor's teenage son, who assisted his father during the summer, was perhaps a further incentive--especially for the adolescent participants.

Remote tutoring was used effectively. Tutoring by message exchange through the computers (via telephone lines) seemed to work well. Remote tutoring was frequently used to augment or replace some face-to-face tutoring sessions. It provided the added advantage of allowing tutors to pinpoint errors in operation as they occurred when participants were actually using the equipment--more of a "learn by doing" approach. All participants seemed to easily adapt to this tutoring method.

Educational applications provided direct benefits for the school-aged participants. Perhaps the most directly measurable impact of personal computer training was its influence on the schoolwork of younger participants. The individual attention provided by the tutors was probably one factor in helping these participants expand their learning opportunities, particularly in mathematics. Also, the ability to more easily produce legible written assignments, using the computer word-processing capabilities and a small printer, was of significant benefit to the school-aged participants. By reducing the time required to produce such assignments, participants were left with additional time for attending to the accuracy and clarity of their work.

Although only a few vocational avenues had been explored at the time of this report, progress was noted among particular participants. All of the participants gained vocational experience by programming computerized mailing lists and working with special computer programs used for calculating interest payments on long-term loans. The tutors hope such activities may be used vocationally by some participants. In at least one case, a participant discovered that the computer skills she had learned will be useful in a proposed career change. Also, tutors see the possibility that more intrinsic impacts were made in reference to the improvement of work-related skills, such as accepting responsibility for tasks and timely completion of assignments among participants.

The goal of expanding interpersonal communication via the bulletin board system is beginning to show positive results. The bulletin board served more as a link with the tutors than with others outside the group; it also began to link this group with other personal computer users (the phone number for the system was published in computer magazines and newsletters). One participant struck-up an ongoing dialogue with an out-of-state computer user via bulletin board messages (this activity occurred following the periods covered in the content analysis). Opportunities for other such exchanges may improve in the future as more people become aware of the system's existence.

There is qualitative evidence that the self-esteem of some participants was enhanced by their participation in this demonstration. Admittedly, self-esteem is a difficult concept to measure. However, it is the judgment of the tutors that some participants showed marked improvement in personal initiative and self-expression over the course of the demonstration.* A parent of one of the adolescent participants made similar comments about her child based upon perceived differences in the child's interactions with others in the family. This participant showed more self-assurance by sharing her new-found expertise with others in the home.

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*For other ways in which the tutors saw impact from this application, see "Networking Microcomputers for Vocational, Educational, and Social Development of the Developmentally Disabled," James Schumacher, Fred Abraham, and Gisela Wilson, Institute for the Future, 1981.

Chapter III:
Computer Conferencing

COMPUTER CONFERENCING

One of the most frequent themes raised during the needs assessment was deinstitutionalization, which is the process of moving DD people out of institutions and into outside communities. The computer conferencing demonstration was a direct response to concerns raised about deinstitutionalization, although the focus was on one specific aspect--severe behavior problems.

The idea for this demonstration was first discussed in late summer 1979, shortly after the decision had been made to work in Vermont.* The vision of the demonstration arose from the growing concern over chronic behavior problems related to long-term institutionalization of DD people. In many cases, specific aggressive or self-injurious behavior problems preclude an institutionalized person's release. But, if these behaviors can be controlled, a return to the outside world may become possible. Professionals at Brandon Training School and Waterbury State Hospital recognized that sharing information about these problem cases would be useful. Rural Vermont's harsh winters and poor roads discourage such exchanges and make centers of expertise seem inaccessible. Telecommunication was seen as a possible answer, a way to provide working links with other institutions across barriers of distance and time.

In addition to Brandon and Waterbury, the Center for Developmental Disabilities played a key role. Located at the University of Vermont, the center was the base for the umbrella telecommunications project. Three organizations outside Vermont that expressed an early interest became participants: Shriver Research Center (Waltham, MA), Roosevelt Hospital (New York City), and Staten Island Developmental Center (New York City). The Alternate Media Center was responsible for organizing the demonstration, and the Institute for the Future was charged with tracking and reporting the results.

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*At the same time, a second computer conferencing application was also considered. This application would have provided a computer linkage among a national network of professionals interested in standardizing epilepsy treatment protocols. Despite substantial exploratory efforts by AMC staff and others, there was insufficient agreement and effective support for pursuing the application.

Several characteristics of computer conferencing made it a likely telecommunications medium for the demonstration. Computer conferencing uses telephone lines to facilitate exchanges among groups of participants. Unlike the audio conferencing activities described earlier, text rather than voice is transmitted. Because of the medium's storage capabilities, participants need not be present simultaneously; busy schedules were not formidable stumbling blocks to group communication. This medium's potential for expansion into a national or international network was also attractive.*

The demonstration connected staff people at varied institutions for the developmentally disabled via a computer conferencing network. Resource persons from universities and hospitals were involved. The subject was extreme behavior problems, particularly aggressive and self-injurious behaviors. If, for instance, a DD person in an institution frequently hurt himself or others, outside placement was impossible. Specific cases were described anonymously, and advice was sought from others with experience in similar cases.

The complete life of this demonstration, from first glimmer to final assessment, was a little more than one year. The time line in Figure 8 illustrates the progression of key events.

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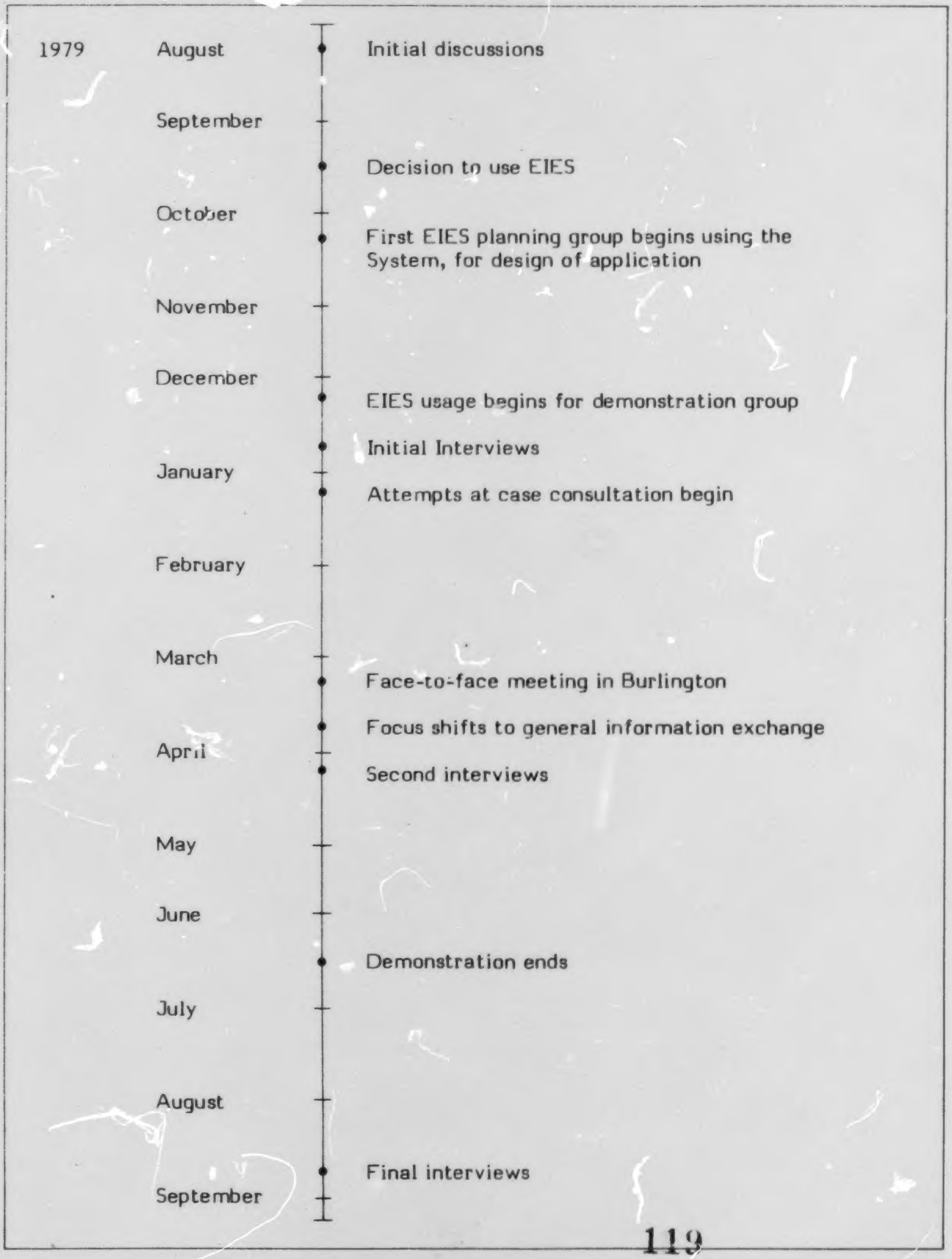
*A separate project paper is available from the Institute that describes the concept of computer conferencing as it can be used in the human services. Currently available systems and services are also listed. This paper resulted partly from the experience of selecting a computer conferencing system for use in this demonstration. See "Choosing an Electronic Message System," listed in Appendix 7.

FIGURE 8

Key Events in the Computer Conferencing Demonstration


1979
August
Initial discussions
September
Decision to use EIES
October
First EIES planning group begins using the System, for design of application
November
December
EIES usage begins for demonstration group
Initial Interviews
January
Attempts at case consultation begin
February
March
Face-to-face meeting in Burlington
Focus shifts to general information exchange
April
Second interviews
May
June
Demonstration ends
July
August
Final interviews
September

Eleven people participated in the actual computer-based communication. Five of these participants worked directly with DD people in institutions, three were administrators, and three were from university research environments. Three Vermont sites were involved, one in New York City, and one near Boston.

The computer conferencing system selected for the demonstration was the Electronic Information Exchange System (EIES) at the New Jersey Institute of Technology. This multipurpose system has capabilities for message exchange, group conferencing, and keeping personal notebooks, as well as a variety of other tasks. The system was originally designed with support from the National Science Foundation and had over 700 users. The demonstration participants conducted a private conference via EIES, but were also free to exchange messages with others beyond their group or to join "public" conferences on the system. Other EIES users were not able to enter the demonstration conference. Most of the demonstration usage was confined to the small group of participants.

All of the participants used standard portable computer terminals (Texas Instruments 745s) lent to them for the demonstration. To access the computer network where EIES resides (Telenet), Vermont participants had to call Albany, New York; the participants in Boston and New York only had to make local telephone calls. AMC staff went to the location of each participant for initial training sessions, where participants learned to call the computer network, enter a series of codes, receive messages sent since they were last present, and type messages for others to see. Although AMC provided this in-person training at each institution when the terminals were delivered, the person trained at these sessions was not always the ultimate user of the system.

At the beginning, the substantive focus of the communication was specifically geared toward case consultation on severe behavior problems. The vision was that personnel at DD institutions would enter case descriptions of particular problems they were facing. Colleagues at other institutions and other resource people were then expected to comment on the case descriptions and offer advice. The first task was to choose a standard format for describing problem behavior effectively. Although a number of behavioral coding formats was available, choosing one that was acceptable to all the participants--including administrators, therapists, and on-line staff--proved to be no simple matter. Also, the selected format had to be appropriate for entering into the conferencing sytem as a text message.

Beginning with standard behavior-coding forms, participants tried a variety of possible protocols, or procedures. Each attempt was greeted with criticism by some participants. It became clear that even the development of an acceptable behavior-coding format for use in computer conferencing was going to be very difficult. Personnel at institutions said that even the most complex formats did not adequately describe their cases. The more complex the format, the more difficult and time-consuming it was for them to fill it out. Similarly, participants asked to give advice on problem cases were frustrated that the formats did not provide them with enough detail to respond well. Some said it would be unprofessional to provide consultation based on such limited information.

Participants described only three cases in the computer conference during the demonstration, each using what the group had accepted as the least controversial of the behavior-coding formats and each reporting general frustration with the planned format of describing problem cases and asking for advice. Responses to these cases were very limited, and most of them were private messages, which were not available for analysis.

Since none of the participants had experienced computer conferencing before, it took time to become familiar with the new medium. Also, EIES is a rather complex system for novice users. A simple version of the users' manual was developed by AMC, but some participants relied on the comprehensive manual, which was a bulky notebook. Help was provided via private messages through the system, if participants requested it. However, some participants never became fully comfortable with the new system.

All of the participants were very busy people, with many responsibilities beyond participation in this demonstration. There were--with only one exception--no specific release time arrangements to allow concentrated, high-priority participation. While the participants were not charged for their participation, neither were they compensated for their time.

The exception to this pattern made a big difference in the balance of the participation. A research assistant worked about 30 hours per week on this project, orchestrating system use at the University of Vermont. This person checked the system at least once a day, forwarded requests for information to appropriate people at the university, and collected responses, which a secretary entered into the system. Thus, University of Vermont's participation in the demonstration indirectly involved a much broader circle of people than those using the system directly. The other organizations had fewer formal structures for using the system, and their participation was considerably more limited.

The communication struggled along for the first two months with far more private messages exchanged than public. This ratio had important implications for the cohesiveness of the group. Exchanges were occurring, but most of them were on a one-to-one basis. What public messages were exchanged typically dealt with administration or planning of the demonstration, rarely with substantive topics. Public exchanges began to increase in frequency during the month of February, but the range of topics was much broader than the specific case consultation conceived initially.

Early in March, frustrated, the group agreed to a face-to-face meeting of all the demonstration participants. Most of the participants had not met one another personally before. Held in Burlington, the meeting was one of the high points of the demonstration. Participants got to know one another and learned more about one another's work and needs. They decided that the case reporting/advice format was too rigid for their needs and should be replaced by a more open-ended information-exchange format. They also discussed how to use EIES effectively; it became clear that several had never really become comfortable using the system.

They left Burlington with renewed enthusiasm, looking forward to more intensive exchanges via computer conferencing. Unfortunately, the week after the meeting was a week of computer idiosyncracies: Either EIES or the network it uses was out of commission much of the time those first few days. Enthusiasm drained. Once the system was fixed, usage grew markedly--with significant increases in substantive public discussions. This was the peak of message system usage. The basic format for the communication was open-ended discussion, often in a question-and-answer mode. Typically, a participant would enter requests and receive various responses. Occasionally, one response triggered another response, leading to a longer discussion thread--but only rarely. They usually took place between two persons or among a subgroup.

Discussions of more general questions rarely occurred during the demonstration. When such topics as setting goals for the demonstration or deciding the optimum number of participants were raised, there was rarely much response. The participants used the medium for specific requests and responses, rather than for discussion of broader issues.

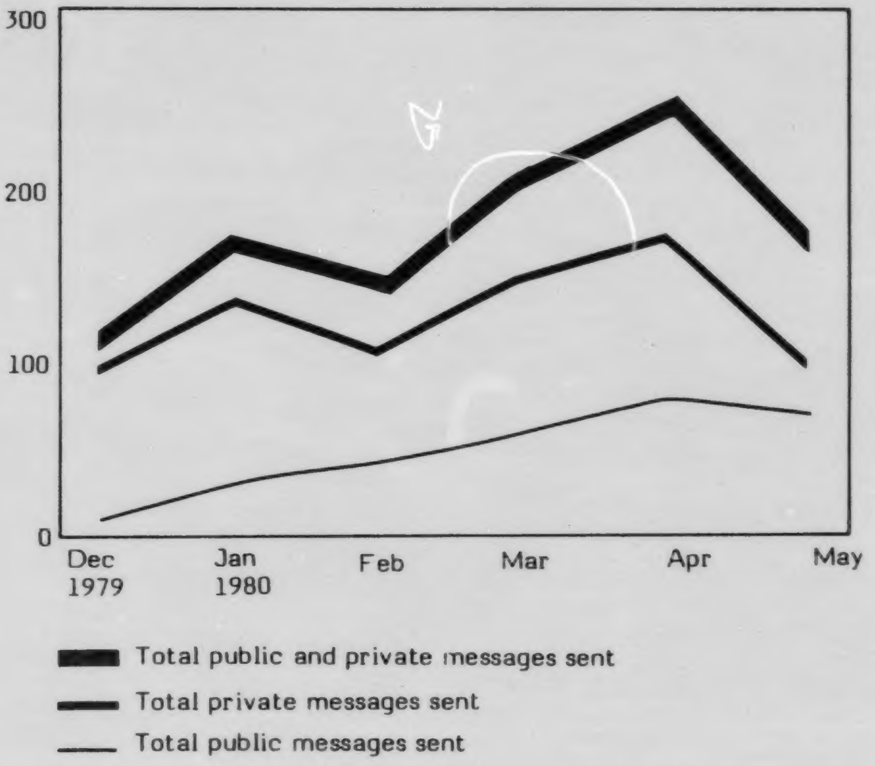
Figure 9 provides a summary view of activity during the six months of actual computer conferencing. In particular, note the differences between public and private messages. Even when public messages increased, so did private messages. Interpersonal and subgroup exchanges were more typical of this demonstration than was group interaction.

There were periods when leaders emerged, but only briefly; the momentum of the group was always in question. AMC had one person in the conference at all times, but this person changed during the demonstration and had varied levels of involvement in the direction of the group. The most regular leader of the group was the research assistant from the University of Vermont.

FIGURE 9

Electronic Message System Activity

by Public and Private Messages*



*"Public" messages were seen by all participants in the conference. "Private" messages go only to the person or persons to whom they were addressed.

IMPLEMENTATION COSTS

Equipment and Operation:

The initial implementation costs included charges for portable computer terminals and attendant materials.

Computer Terminals (10 @ $1500)	$15,000.00
Service agreements for terminal maintenance (10 @ $300)	3,000.00
Terminal paper ($48 per 24 roll case)	48.00
	$18,048.00

The basic operational costs for this activity were dependent upon system user account fees and computer connect time charges.* Typical monthly operational costs are listed below.

9 user accounts (@ $66 per month)	=	$594.00
Computer network connection for urban areas (@ $3.75 per hour) average = 15 hours per month	=	55.95
Computer network connection charge for rural areas (@$15 per hour) average = 15 hours per month	=	225.00
Monthly charge during demonstration	=	$874.95

Personnel Time

September 1979 to May 1980

Principal Personnel:	Staff Time
AMC Researchers (3)	14.6 person-weeks

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*Typically this involves per minute charges for the amount of time a user's terminal equipment is actually directly linked to a central computer.

CONCLUSIONS

With this basic understanding of what happened, it is possible now to look more closely at questions of evaluation.

The principal evaluation tools were telephone interviews with the participants--conducted before, during, and after the demonstration* --and loosely structured participant observation of computer conferencing as it occurred. The computer collected statistics on the use of EIES, which the Institute analyzed.

Evaluations are usually viewed as appraisals of the signficance , worth, or success of an undertaking. In this case, the evaluation is as concerned with what might have happened as what did.

In retrospect, the initial goal of the demonstration may have been faulty. The task of describing extreme behavior problems in a way that would satisfy both "hands-on" staff people in institutions and outside resource people proved, in this case, insurmountable. One participant speculated that the problem should have been foreseen, because staff people in institutions would have recognized the impossibility of the task. It is true that the vision of the demonstration was developed by administrators of programs, not people who were currently working directly with severe behavior problems in institutions on a daily basis. Such hindsight may be of little value now, however, except to suggest that the initial vision of such a demonstration ought to include the perspectives of all the key participants. In this case, the vision was "passed down" to participants who never fully shared it.

There also seems to be a key point here about the specificity of the first demonstration goal and the "all or nothing" quality that it attracted. The group had no contingency plans, and this first goal was clearly a difficult one, perhaps even a "long shot." Some form of evolutionary path, beginning with more easily doable tasks that could then lead into more complex--and risky--tasks might have helped to relieve some of the problems.

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*See Appendix 5 for the interview schedule.

It is important not to undervalue the successful communication that did occur during this demonstration. Interdisciplinary exchanges developed around specific topics--sometimes specific cases. There was important evidence of peer support and morale boosting for the professionals, who all work in high-stress environments. And there was even some discussion of new research areas where future work is needed. The organizational ties established during the demonstration held firm and are still expanding.

Some information exchanges were simply direct matches between one person who had information and another who needed it. A request for information on sex education resources was entered in the conference, for instance, and immediately elicited helpful responses. In other cases, the utility of the information exchanged was more subtle. Most of the participants were familiar with basic behavior management techniques; however, important clues were exchanged regarding special schemes or tricks of adapting formal techniques for real-world use. This information is not contained in textbooks, yet it is critical to the success of many treatment programs.

Perhaps the most important discussion concentrated on negative, or aversive, versus positive reinforcement methods. Several participants reported that this exchange was quite useful to them and suggested some important new research areas they had not previously considered.

A certain irony to this demonstration evaluation surfaced in the final participant interviews, but with varied interpretations. The irony is that AMC is well known for its attention to the daily details of effective organizing of demonstration efforts. Indeed, the kinds of problems that occurred in this demonstration are described in considerable detail in previous AMC reports.

This demonstration was one of several organized simultaneously by AMC, and this one simply did not get as much attention as the others. AMC leadership was provided by two people working part time on the project, rather than by one leader who could maintain continuity and devote the time needed. And no overall organizing force emerged from among the participants. The participants themselves were somewhat confused over just who was meant to be the driving force behind the demonstration; there was a leadership vacuum.

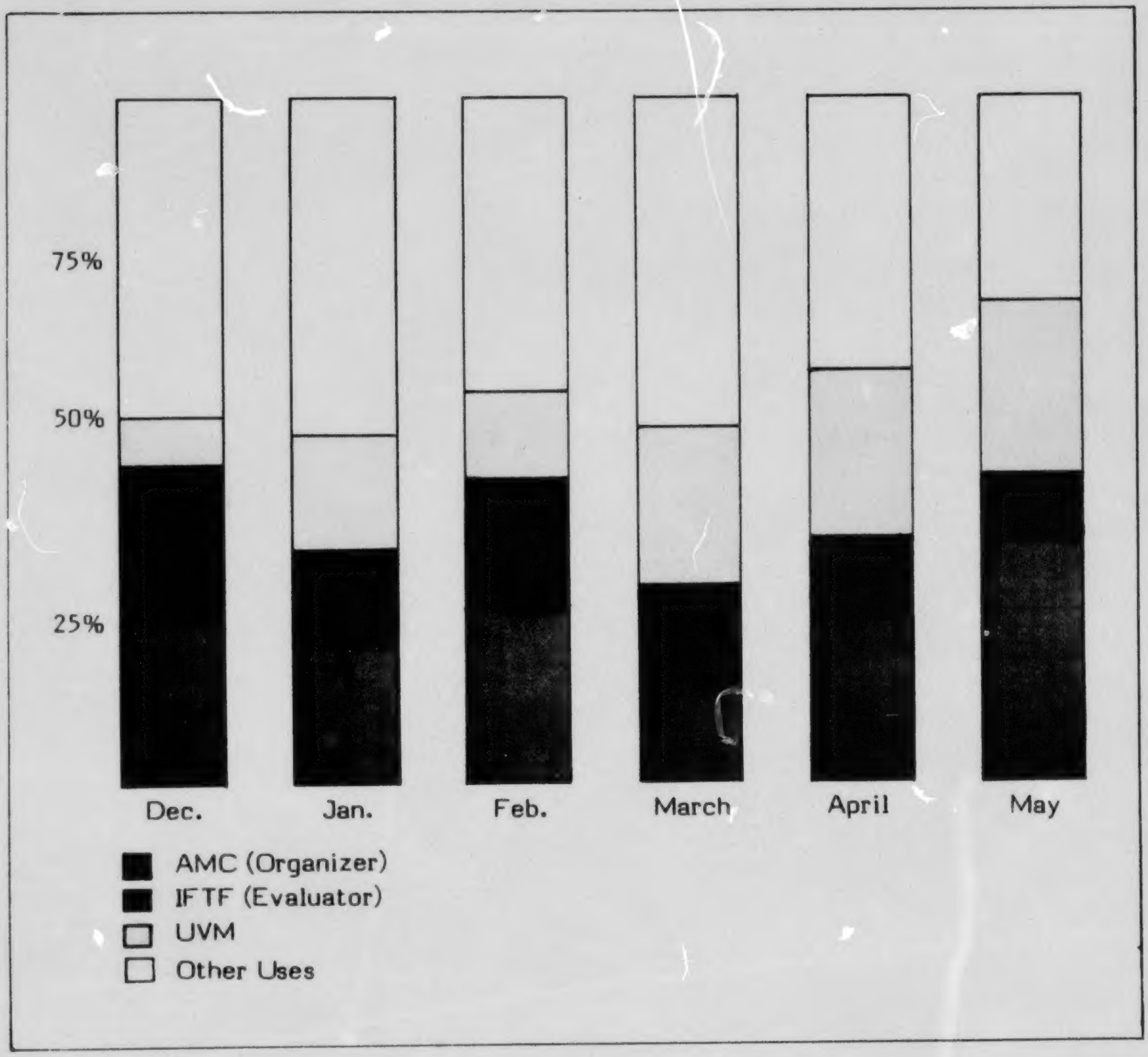
The University of Vermont's research assistant assumed much of the leadership role. This person acted as a facilitator, responding to problems and generally trying to keep the discussions moving along. She also forwarded requests from demonstration participants to other resource people at the university--beyond those directly involved in the computer conference. But this was their first experience in computer conferencing.

Figure 10, developed from the usage statistics on EIES participation rates, displays the relative balance of messages sent by the organizer and evaluator, compared with the total number of messages sent. When the University of Vermont is included as an organizer, the total percentages become even higher. Relatively little participation came from the participants. It also shows that the organizers were trying to keep things going, but never seemed to establish a sense of momentum for the conference as a whole. Typically, successful leaders participate heavily in the early stages of a project and manage to encourage others to assume their responsibilities later on, thereby encouraging self-sufficiency.

Nor was there an emergent leader in the conference discussions. At various times, different people assumed leadership roles for brief periods, but it was often as though each person was looking to someone else for a sense of direction.

FIGURE 10

Percent of Total Messages Sent By Demonstration Organizers and Evaluator



While it is possible to criticize the organization of this demonstration, it could also be argued that the most critical problems resulted from the fact that this group never really became a group. It lacked commitment, cohesiveness, and a sense of common purpose. It may have been a question of never getting quite the right "chemistry" among the participants. It may be related to the rather large status differences among participants. It may have been that most participants had not known one another and had not even met face to face until the demonstration was well underway.

Whatever reason, there were obviously disappointments in how the group evolved. And obviously--whether there were inherent problems with the group-- the lack of participation and cohesiveness were related and contributed to other difficulties in the demonstration.

One of the primary reasons AMC chose EIES for this demonstration was the expressed need for group communication among participants. It now looks as though a much less sophisticated system would have been adequate for the type of communication that occurred. The primary uses were for interpersonal exchanges (i.e., electronic mail) and bulletin-board-type exchanges much like those now in use with personal computer systems.

The appropriateness of the system and training are two sides of the same coin. Certainly, the telephone interviews suggested that most of the demonstration participants had only limited skills in using EIES--even at the conclusion of the demonstration period. It could be argued that these users saw the varied features of EIES as confusing and that the system design had something to do with the limited uses that emerged. Or it could be argued that, given adequate training, the additional capabilities of the system would have enhanced the communication. Here, the conclusions are not obvious, beyond the fact that only simple system capabilities were used during the demonstration.

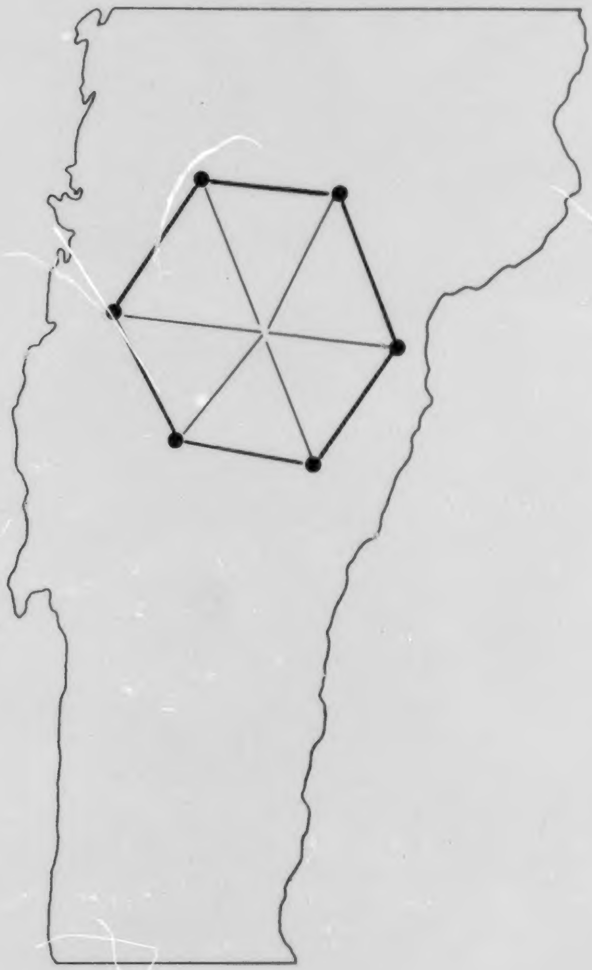
The telephone interviews revealed a unanimous interest in the concept of communication through computers as a future aid to human services delivery. However, this demonstration never became a high priority for most of the participants. Perhaps saying it would work in the future should be taken cautiously, for some would argue that a chance was missed for it to work in the present.

When asked for an overall rating of the demonstration in the final interviews, virtually everyone rated it three on a five-point scale from very good to very poor. The rating indicates that something intrigued participants, something offered a promise--they sensed untapped communications possibilities.

Chapter IV:

Vermont Telecommunications, Inc.:

Toward a Telecommunications Cooperative



VERMONT TELECOMMUNICATIONS, INC.

From the early planning stages, AMC sought to set in motion demonstrations likely to be continued beyond the life of the project. In Vermont this objective meant not only careful attention to finding activities that had a certain "staying power," but also finding a "home" where ongoing support and coordination could be focused after the team left Vermont.

In September 1980 the project officially ended in Vermont. At that time the Vermont Developmental Disabilities Council had agreed to assume responsibility for project activities until a more permanent arrangement could be established. A transition committee had already been formed. The project team's administrative aide continued to work on the bridging service. The transition was under the overall supervision of the DD Council's executive secretary.

Vermont Telecommunications, Inc. is a nonprofit organization created on October 1, 1980, to promote telecommunications technology for the benefit of persons with developmental disabilities and other handicapping conditions. Income derived from VTI's services is used to continue activities initiated in Vermont by the Alternate Media Center.

When an ongoing service capability was initially envisioned, it was hoped that state agencies would be in a position to provide a source of continuing financial support. For some months it seemed such support was forthcoming. Yet, when decision time came, exigencies intervened, such as revenue shortfall in the state, a decision by the state legislature not to fund any new programs at that time, and the beginnings of federal cutbacks. Funding for new telecommunication activities was not included in the state budget for fiscal year 1982.

At that point the choice was to continue or discontinue. Continuing meant finding alternative sources of funding and marketing the service. In discontinuing, a project goal would not have been met.

VTI decided to continue to offer a teleconferencing service that would allow low-cost access to DD users and comparatively low-cost service to all other users. (The rates as of June 1981 are shown in Chapter 1 under "Implementation Costs.") Though VTI continues with no state funding it does enjoy the active endorsement and support of the state's Agency of Human Services.

Because VTI started after the project's formal data collection period ended, this evaluation is not designed to assess its service or usage during its first months in operation. In general, however, there are some basic conclusions to be drawn:

VTI began with a flexible approach, allowing for a change of strategy when anticipated state funding did not materialize. In some demonstrations this type of setback has been fatal. Here it was viewed as an obstacle but not as a deterrent. New approaches to marketing and funding were developed. Underlying this orientation appears to be a determination to explore all possibilities to ensure VTI's survival.

It is not immediately apparent that there is a market for VTI services. It seems clear at this juncture that DD organizations alone cannot sustain VTI's operation. New user groups--other public agencies, nonprofit groups, and groups from the private sector--are needed to develop a secure base for VTI's future.

There has been a substantial commitment to the goals and objectives of VTI. Following the project, local group leaders and others active during the demonstration period committed their time and energy to making VTI viable.

VTI is experimenting with various telecommunication technologies for services to the handicapped. It has tested, for example, the feasibility of linking TTY terminals used by the hearing impaired for telephone service in an audio conference mode.

VTI needs at least several years development before it can be judged successful or unsuccessful. This initial period is a "touch and go" one for this organization. There is no precedent for it elsewhere. Based on other demonstration efforts, however, it is safe to assume that many months of trial and error are needed before the organization can be fairly judged.

PART TWO:
NATIONAL ACTIVITIES

however, was not possible. It should be noted that this was one of the few commercially available electronic mail systems at the time the selection was made.

Throughout the demonstration period, an Institute resource person was available by phone or computer to assist any participant who had difficulty using the message system. Institute staff monitored system use on a regular basis and maintained detailed records both of the number of messages sent and received per location and of associated costs of system use. Also, near the end of the demonstration, we conducted a mail survey of all UAP message system users. The survey instruments were designed to obtain feedback from participants on their perception of the utility and the effectiveness of the demonstration.*

Use of the system increased steadily during the demonstration period, with no extended periods of decline. The principal catalyst for early expansion of system use came primarily in response to initiatives from AAUAP. Early in the demonstration, AAUAP began providing periodic updates on activities in Washington, D.C. The updates were distributed in the form of messages to all users of the computer network. Nonuser UAP locations received this information in the form of copies of the original messages at the end of each month.

Essentially, the monthly updates-package for nonsystem users served to show them what they were missing. The timely receipt of updates was given as the impetus for system use by many locations joining the network in the early months of the demonstration. It became apparent that the nature of the information exchanged via the system was as important, if not more so, than the less tangible possibility of increased contact with distance colleagues.

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*See Appendix 6 for copies of the questionnaires and numerical responses.

IMPLEMENTATION COSTS

Equipment and Operation

The basic equipment required for this demonstration was a computer terminal and an acoustic coupler (modem) for connection to a central computer via normal telephone lines. An equipment budget of $6,000 was initially set aside for the purchase of portable computer terminals (typically costing about $1,500 each) available on loan to some participants. In general, most of the UAPs already possessed such equipment. However, three terminals were purchased and made available to UAP participants who did not have equipment. The remainder of the equipment budget was turned over to the AAUAP at the end of the demonstration period to provide small grants to other potential UAP users for the purchase of equipment.

The basic costs for message system use during the demonstration resulted from number of messages sent, per minute charges for time spent connected to the computer, storage of data on the computer, number of characters typed, number of sessions, and monthly service charge.* Costs data were collected under those categories as both costs per location and as combined costs for all locations. Figure 11 shows monthly costs for all users during the demonstration period. In general, average monthly operational costs throughout this period were about $700.

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*An account charge of $100 was levied by the supplier. This charge covered a single account for all UAP users.

Chapter V: Electronic Mail

ELECTRONIC MAIL

In many of the seminars conducted during the national needs assessment, there were frequent references to a need for improving communication among university affiliated programs (UAPs). In a number of instances, specific suggestions were given regarding setting up a national computer network for message exchange* to facilitate the sharing of resources and expertise. Although the 47 UAPs share common goals and work together on certain projects, each functions administratively as a separate entity. Building a network across programs was considered a major communication-related need, which fit the overall mandate of this project.

To address that need, the demonstration activity reported here was implemented in November 1979 and ran until September 1980. The Institute for the Future organized the demonstration, which involved the use of a computer-based message system by UAP staffs. The principal objective was to demonstrate the feasibility of using electronic mail to support staff networking efforts at those facilities.**

The network that began during the demonstration continues to operate under the auspices of AAUAP. As of June 1981, it included 34 UAP locations and 14 state DD councils nationwide.

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*An existing "database" containing information about these centers was often suggested as a starting point toward furthering expanded communication. Its function, however, is the storage and retrieval of statistical information on UAP resources and service provision. Conversion of this network into a more interactive format for message exchanges was considered unfeasible.

**This was a shift in roles from the other demonstrations. Here, AMC asked the Institute to play an organizational role because AMC staff were already fully committed in Vermont and because the Institute had organized similar demonstrations in the past. Thus, the Institute both organized and evaluated this demonstration.

Initially the focus of the demonstration was on three national UAP task groups that might function as core system users and provide a foundation for expanded use. (The three groups were selected in consultation with the Telecommunications Subcommittee of AAUAP.) The criteria for selection emphasized a perceived need for communication among group members, geographical separation, and a common purpose.

In addition to use by specific task groups, the message system was generally available to staff at any UAP that had the equipment* to access and use it. To encourage widespread use, specially developed instruction manuals were available to any UAP as well as on-line training of the UAP staffs in system operation.

A commercially available computer message system was used for this demonstration activity.** Such systems differ from computer conferencing systems because they are essentially designed to support person-to-person rather than group communication. The system used for this demonstration was relatively simple to use and required no computer knowledge to operate, only the ability--or willingness--to type. Messages were addressed, dated, and stored for retrieval by intended recipients. The system also provided limited filing (private or group access) and editing features. Real-time (synchronous) message exchange (a feature of computer conferencing systems),

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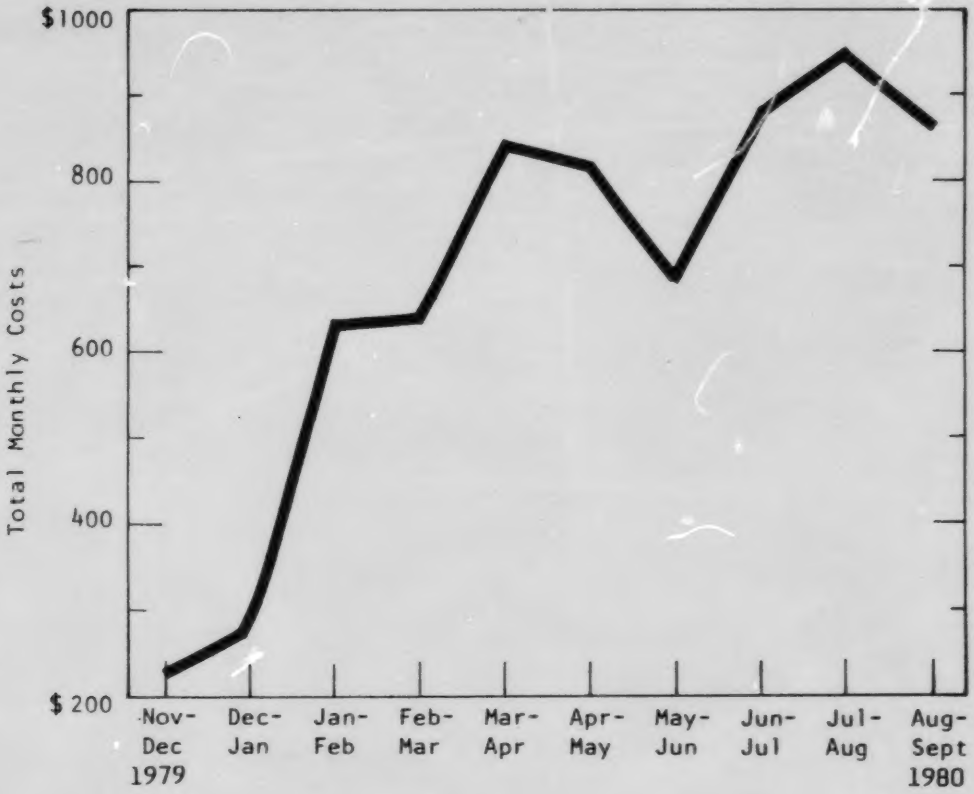
*As part of the demonstration activity, a limited amount of funding was available for the purchase of equipment. Three portable computer terminals were purchased by the project and loaned to various participating locations.

**Called OnTyme, the system is marketed by Tymnet, Inc., Cupertino, California. An earlier pilot test with limited usage had been conducted by AAUAP during the spring of 1979. See National Networking among UAPs: A Pilot Test of Electronic Mail, Institute for the Future, November 1979. OnTyme was also used for the pilot test. This was one of the few systems available at the time of this project. For a review of factors involved in choosing an electronic message system for human service groups, see "Choosing an Electronic Message System: A Guide for the Human Services," Institute for the Future, September 1980.

FIGURE 11

Total Monthly Costs for Message System Use

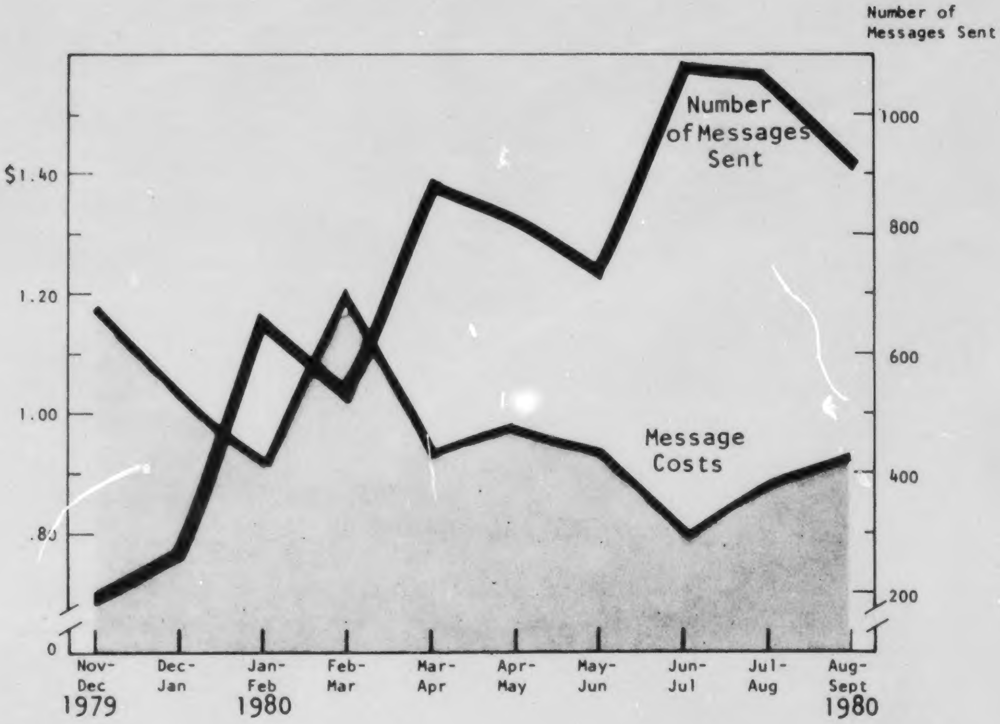


Due to the cost structure of the commercial service being used, usage costs per site were not uniform. Users in metropolitan areas were charged less per minute of connect time than users in lower population density areas where telephone lines are more expensive. Centers in remote areas, such as the Arizona and Montana satellites, require even more costly access numbers (i.e., 800 or WATS lines). In addition, the amount of connect time a user consumes is affected by typing speed, terminal speed, and length of message. Storage costs for keeping messages on the system until read by intended recipients are also a factor in determining usage fees.

Cost for message system use can be defined more specifically by looking at average costs for the number of messages actually sent. Although the specific transmission rate is five cents per message, this figure does not take into account other associated costs, such as connect time. A more accurate reflection of how much each message costs to send can be gained by considering the total cost of system use in conjunction with the number of messages sent. Figure 12, below, shows average cost per message sent during the demonstration period. The greater the number of messages sent, the lower the average cost per message. The highest average cost per message sent ($1.21 from February to March) is actually about 10 cents less than a three-minute direct-dial phone call between New York and San Francisco.

FIGURE 12

Average Cost per Message Sent



As noted earlier, an Institute staff member spent a significant amount of time organizing the electronic mail demonstration. Organizational activities included identifying and training system users, handling the commercial account, preparing a special users' guide, documenting system usage as well as individual and group costs, daily log-ins for tips on usage and user alert memos, and responding to requests for assistance.

In terms of person-weeks of effort, Institute staff time commitments for this activity during its early stages are listed below:

October 1979 - May 1980

Development 5 person-weeks

Principal Personnel:

Institute Project Leader

National Networking Coordinator

Organizational Management 7 person-weeks

Principal Personnel:

National Networking Coordinator

The experience demonstrates that such organizational assistance was a big factor in the success of the demonstration. Subsequent administration of the system by the AAUAP following the demonstration provided for a continuation of this level of effort by a specially designated AAUAP system organizer and contact person.

CONCLUSIONS

During July and August 1980, a mail survey of all UAP electronic mail users was conducted. Twenty one-page questionnaires and 40 four-page questionnaires were mailed to participants. The response level was high, with 14 returns on the short questionnaire (70 percent) and 33 returns on the more detailed questionnaire (83 percent). The results indicated that a significant majority of users found the demonstration promoted useful communication:

- 85 percent (28) of the survey respondents indicated that the message system had increased their contact with colleagues at other UAPs.
- 97 percent (30) thought the network should be expanded to include more UAPs.
- 89 percent (24) said they would continue to use the system even if they had to pay their own cost.

At the time the survey was conducted, 33 active system identifications were on the UAP account, representing 27 UAP and/or satellite facilities, including AAUAP. Sixty individuals were identified as system users; the director/administrator and at least one other contact person at each facility received a questionnaire.

Two different survey instruments were used: a one-page questionnaire for message system users who routed their messages through another staff person (secretary or data processing operator) and a four-page questionnaire for those who actually used the computer terminals.*

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*Unless otherwise noted, the results discusssed in this section refer to the four-page questionnaire in Appendix 6.

Little difficulty in using the message system. Fewer than half the respondents reported any difficulty in using the message system. Generally, these problems concerned equipment (such as double printing) and system access (such as frequent computer downtime, sporadic disconnection, access to ports).

Users preferred self-instruction as a training method. User training consisted primarily of providing each participant with a user guide and telephone instructions on system use. When asked to indicate their preference in training methods, 75 percent (24) of the respondents preferred self-instruction with a user guide. The high number of users who had had previous experience with computers and other keyboard devices (79 percent--26) undoubtedly influenced their training needs and preferences.

System use affected work patterns. We asked each user to indicate whether the message system had affected his or her typical work patterns; more than 61 percent (20) felt that it had some effect.* They noted a number of positive effects, including

- more effective communication among geographically separated members of a working group
- fewer long-distance phone calls placed, or less time spent waiting for return calls
- fewer letters written
- more responses from colleagues at other locations to requests for specific information.

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*62 percent (8) of the respondents to the short questionnaire also noted some effect on their work patterns.

In a number of cases, however, the noted effects were not always positive. For example, some respondents wrote that

- o too much of their time was required to check into the system and to route messages to other staffers
- o system use brought a much heavier volume of requests for information than they could handle.

Users satisfied with the system for specific activities. One focal question from the survey was designed to provide an insight to the participants' perception of message system utility for certain tasks. We asked each respondent to rate his or her level of satisfaction with the message system for a number of group communication-related tasks.* Figure 13 illustrates how survey respondents ranked these tasks on a five-point scale from completely unsatisfactory to completely satisfactory.

Generally, participants considered those tasks related to the simple exchange of information (group A) better suited to the system than those involving somewhat more complex interpersonal dynamics (group B). Similar results have been obtained for computer message systems in other studies employing a similar taxonomy.

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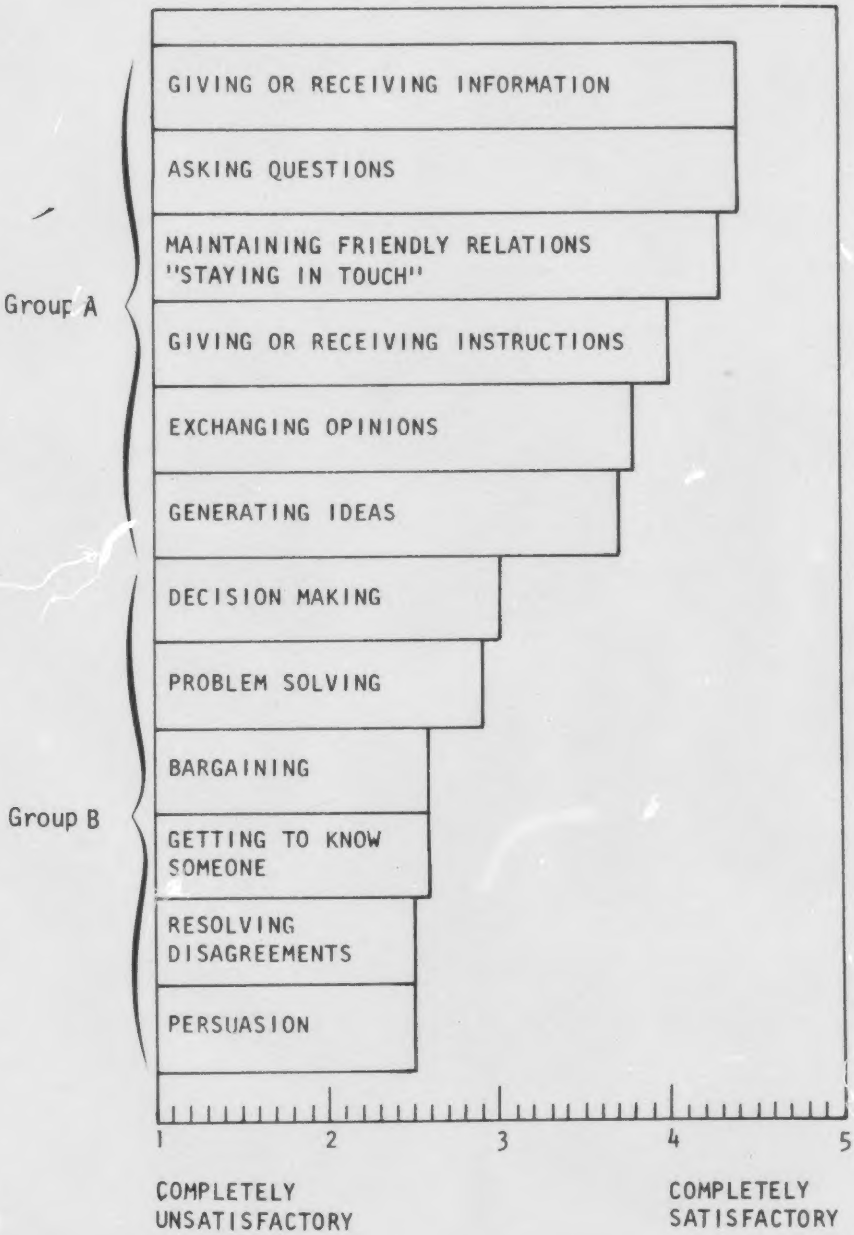
*The taxonomy of tasks is based upon a set of meeting tasks from Roger Pye et al., The Description and Classification of Meetings, Communication Studies Group, London, England, Paper P/73160PY, 1973. Similar scales have been used in research studies involving computer conferencing, such as Starr Roxanne Hiltz and Murray Turoff, The Network Nation: Human Communication via Computer (Reading, MA: Addison-Wesley), 1978; and Jacques Vallee et al., Group Communication through Computers: Social, Managerial, and Economic Issues, Institute for the Future, January 1978.

FIGURE 13

Ranking of Group Communication-Related Tasks



When asked to compare message system use with more traditional communication methods, more than 80 percent said the message system was more productive than conventional mail alone, and 70 percent said it was more productive than telephone calls alone. When compared to face-to-face meetings, however, respondents considered the message system less productive. This latter finding supports the assumption that most people prefer face-to-face meetings.

Preference for continued system use. The participants were asked to indicate whether they would like to see the network expanded and what changes they would like to see in future usage styles. A large majority of respondents wished to see more UAPs involved in message system use.* Participants said that expanding the network would be a good way to

- reduce duplication of information
- keep in touch with colleagues at other centers
- broaden the scope of information sources and services
- facilitate national program planning
- ensure an economy of scale in message system use
- achieve a sense of group cohesion by including all UAPs nationwide.

Responses to questions involving changes in future message system use were in most cases similar. Participants suggested changes related to more efficient use of the system, including

- restricting use to priority issues in the DD field likely to be of interest to all UAPs
- encouraging the inclusion of more staff members at each facility

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*97 percent of the respondents to the four-page questionnaire and 73 percent of the respondents to the one-page questionnaire wished to see the network expanded.

- making requests for information more specific
- reducing the number of messages directed to all users that might more appropriately be directed to specific centers
- encouraging more frequent and consistent message pick-up.

In addition, some participants felt that the message system itself warranted some improvements, such as better text editing and the addition of capabilities for real-time message exchange.

Most of the users perceived the computer-based message system as an effective, cost-efficient way to promote the exchange of information and resources among specialized DD/UAP centers. Electronic mail proved to be a useful adjunct to more traditional communication modes for this group. Generally, information exchange outpaced specific task-group usage, and user acceptance of the system was high: A large majority of the users recommended continuing and expanding the network.

The early vision that a network of users would develop as more centers became aware of the possiblities for increasing their contact with others via this medium, based on the experience of the task groups, was not realized. Although more widespread usage did develop, it was not directly related to the activities of the task groups. When expanded usage developed, it was clear that the catalyst was the nature of the information rather than the experience base provided by the task groups.

This demonstration also reinforces the assumption that a significant amount of organizational effort is required to get things off the ground. The start-up phase of this demonstration was of crucial importance in providing both suggestions for specific usage and an appropriate orientation to the system. Throughout the demonstration, a significant amount of staff time was spent responding to requests from users for assistance. These requests involved organizational issues--such as how the system was being used by others, who else was on-line, and cost factors--as well as problems with access and use. This type of organizational effort is often critical in the start-up phase and may be a decisive factor in encouraging ongoing use once the initial novelty of such a system wanes.

The electronic mail network changed from a demonstration project to an ongoing service on October 1, 1980. At that time, the network became self-supporting. All but six of the UAPs decided to continue as members of the network and to pay their own usage charges. AAUAP added a telecommunications consultant to their staff to oversee the transition of the network as well as to develop additional uses of telecommunications media in general.

AAUAP undertook an initial survey of users as well as interviews with current users and those who dropped the system. As a result, they developed guidelines for network use and actively recruited new users as well as dropouts. They developed a plan to pilot test the inclusion of a limited number of state DD councils in the network. They selected fourteen councils for the trial. During February 1981, AAUAP provided these new users with instruction materials, offered the opportunities to participate in an audio teleconference, and explained how to use the system. The DD councils joined the network, which they renamed "The UAF Network for Electronic Mail," on February 26, 1981. As of June 1, 1981, the network consisted of 14 DD councils and 34 UAPs.

Chapter VI:
Telecommunications Consultations

TELECOMMUNICATIONS CONSULTATION

In keeping with the project's goal to nurture processes for addressing communication needs in the DD field, project staff made an effort to provide technical assistance to groups and individuals interested in exploring telecommunications options. The staff conducted a number of different activities in that area.

The seminars conducted by project staff during the needs assessment phase were not designed for the sole purpose of soliciting demonstration possibilities. They also served as forums for the exchange of information about telecommunications options and their possible utility in human service areas. When project staff met with a group, they not only received information about communication needs as perceived by people in the DD field, but they also sought to disseminate information about available telecommunications options and ways they might be used to meet certain needs. Seminar handout materials included brief descriptions of telecommunications options and examples of their use in the human services. Contacts made with project staff at these meetings frequently set the stage for future consultations with participants considering such options.

At the end of the needs assessment phase, the project team issued a unique document on application possibilities as a part of a three-volume series of working papers, "Telecommunications and Service to the Developmentally Disabled" (Vol. 2: Application Possibilities, July 1979).* This document lists more than two dozen specific communication-related problem areas suggested by seminar participants.* In the document the project staff described each of them according to

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*See Appendix 7 for project publications.

- the need to be addressed, such as training or remote consultation services
- the approach in terms of what media might be most appropriately employed to meet the need
- possible benefits that might accrue from taking that approach
- possible drawbacks of that approach, such as prohibitive costs or difficulties in introducing such innovations into a given organizational environment.

The working papers were one way to synthesize information received about communications needs and to give the project team the opportunity to provide feedback on what they had heard at the seminars. By matching these needs to the capabilities of available technologies, the documents provided rich examples of technological possiblities. Too, by noting both advantages and disadvantages of a given approach, it could serve as a resource for DD agencies considering such options by giving them a better notion of what questions ought to be addressed before such decisions can be made. The document also includes a brief glossary of common terms associated with telecommunications technology and a bibliography of selected resource materials about existing telecommunication applications in the human services.

The project team disseminated resource material on project activities to a spectrum of people and agencies in developmental disabilities and related fields. In addition to the working paper series, which updated project activities, several other publications of special interest were issued, including two resource guides for human service groups on choosing a computer message system and accessing and developing audio conferencing services. (See Appendix 7 for a complete list of project publications.)

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*In each of the seminars, participants were asked to generate a "wish list" of communication problems they wished to see alleviated.

AMC provided direct technical assistance. Although informal technical assistance contracts were rarely documented, the following table lists a number of specific instances of project technical assistance.

Many of these technical assistance activities were initiated and performed during the early months of the project. As the major demonstrations got underway, less staff time was available for responding to such requests.

At the time AMC concluded its work in Vermont (September 1980), AAUAP proposed an extension on its subcontract for the purpose of continuing the technical assistance efforts already begun by the project and for further disseminating information about project experiences. With AMC concurring, AAUAP initiated a series of activities designed to continue the project's outreach.

In addition to incorporating and expanding the electronic mail network (see Chapter 5), other activities included

o State of the Art Cooperative Dissemination Project. This project was designed to bring UAP and State DD Councils together to exchange the latest information in the four priority service areas (according to the DD Act): child development, care management, alternative community living arrangements, and nonvocational social development services. Initially, a series of seminars and specific information resource centers were planned. AAUAP integrated examples of appropriate telecommunications applications into the generic presentations on the four areas and also included a separate session on telecommunications at the seminars. Regional UAPs were selected to (1) serve as a resource for information on the priority areas, (2) make contact with their local DD Council, and (3) make active use of teleconferencing.

TABLE 3
Technical Assistance

Request received from	Method of Response	Providers(s)	User/Result
Exceptional Child Center, Logan, Utah; Montana UAP (satellite facility), Missoula, Montana	Telephone Contact; site visit	AMC	Used information in grant proposals; improved use audio conferencing
Exceptional Child Center, Logan, Utah	Telephone Contact	AMC	Used information in a grant proposal
DD Center, Philadelphia, PA	Telephone Contact, follow-up letter, and background material	AMC	Received information on audio conferencing options
Child Development Center, Providence, Rhode Island	Telephone Contact; site visit	AMC	Shared general information on telecommunications
John T. Steward Children's Center, Lawrence, Kansas	Site visit/workshop; outside training consultant recommended	AMC	Used information in training program
Univ. Hospital School, Iowa City, Iowa	Telephone contact; background material	AMC/IFTF*	Received update on project activities; shared general information on telecommunications options
United Cerebral Palsy, Palo Alto, California	Telephone contact. Workshop with representatives from local DD agencies	IFTF	Shared information on audio conferencing options
Staten Island Development Center, Staten Island, N.Y.	Site visit	AMC	Reviewed plans for microwave hook-up, and cable network
DD Office, North Carolina Dept. of Human Resources, Chapel Hill, North Carolina	Telephone contact	AMC	Reviewed plan for local telecommunication project
Montana UAP (satellite on facility), Missoula, Montana	Telephone contact; background material	AMC	Conducted workshop on audio conferencin options

*Institute for the Future

- Manpower Development Project. This 1981 AAUAP project was designed to update UAPs, DD councils, and federal DD regional officers on the latest studies of manpower trends and issues in the field of developmental disabilities. A nationwide audio teleconference scheduled for fall 1981 will help disseminate such reports and include selected participants from around the country. This teleconference will be followed by updates via electronic mail as well as biweekly audio conferences on manpower issues, coordinated by AAUAP. Also included as part of this effort is a general outline for using audio conferencing in the provision of in-service training programs to workers at community residential facilities for the mentally retarded.

Central to these technical assistance activities was the idea that the technology alone offers no solution to communication needs. Creative and innovative usage that addresses a real need is the key to success. Project staff stressed the need for making informed decisions on various technological options with an emphasis on how the technology is to be used, not the equipment itself. It was a project goal to share the learning experiences in this area so those working in the DD field might be helped to develop internal capabilities for making effective use of telecommunications.

While the needs assessment demonstrated that UAPs and many other DD organizations have generally well developed resources for audiovisual technical assistance, support for interactive telecommunication activities was almost nonexistent. Technical support during this project was not intended to be a major remedy for the problem. Rather, it offered the project team resources for temporary consultation. Long-term technical support for telecommunication activities in the DD field needs to be addressed at the national, regional, and state levels.

PART THREE:

CONCLUSIONS AND POLICY IMPLICATIONS

CONCLUSIONS AND POLICY IMPLICATIONS

Effective. Affordable. Accessible. These were the qualities sought in each of the varied telecommunications demonstrations conducted during this project. Now, considering the overall effort, it is appropriate to ask whether they were attained.

One could argue, of course, that it is too early to make a final evaluation of a complex demonstration effort such as this. It will take years, some will say, before the bottom line becomes clear. Certainly, there is a real sense in which that is true. However, despite current budgetary and policy upheavals, decision making will continue in the DD field.* No matter what course the DD field takes in the future, the experience of these demonstrations remains relevant. In this section, we present the conclusions from these experiences in a form useful to decision makers who will decide whether to attempt similar telecommunications innovations elsewhere. Too, we will draw implications for general policy making regarding the future use of telecommunications in the DD field.

Effectiveness

Appropriate uses of telecommunications were demonstrated and the potential for continued operation--beyond the funding period of the HEW grant--looks promising. Such continued operation is a major indication of success, a type of success that few demonstration projects have attained. The electronic mail network now seems established as an ongoing service, and the personal computer uses will continue at least through September 1982. Table 4 summarizes the current status, along with our best judgment about future prospects. In these days of funding constraints, such future prospects are indeed impressive-- they may be the best indicators of the effectiveness of the demonstrations.

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*See also "The Effect of Current Economic Pressures on the Scope for New Telecommunication Services in the Field of Developmental Disabilities." Martin C. J. Elton, Alternate Media Center, 1981.

Beyond such "vote with your feet" indicators of effectiveness, this evaluation has relied primarily on the stated views of participants as gathered in interviews and questionnaires. As was shown in the earlier chapters of this report, these attitudes were strongly skewed in a positive direction. Such personal testimony of users is often very important to decision makers, and the testimony in this case suggests that users in the DD field respond well to the introduction of this type of telecommunications innovation.

TABLE 4

Current Status of Demonstration Systems

	Current Status	Prospects for Continuation
Audio Bridge	Ongoing, Vermont Telecommunications, Inc.	Fair to Good
Personal Computers	Ongoing, Vermont Telecommunications, Inc.	Good
Computer Conferencing	Discontinued	
Electronic Mail Network	Ongoing, American Association of University Affiliated Programs	Good

While the evaluation methodology of this demonstration project was lean compared with controlled experiments, it has yielded robust reactions from early users. Such reactions may be crucial to decision makers who need to mount early support for new programs of this kind.

Effectiveness, however, is clearly related to more than the technology and the user's response to it. These demonstrations have shown that the process of introducing the technology is the key dimension. The style of AMC in organzing the demonstration played a major role. Even those negative reactions that were encountered could have been related to such issues as much as reactions to the technology itself. The key for decision makers is to remember that the introduction of a new system must be orchestrated by someone, and the conductor of the orchestra will be more important than the particular instruments being played. Thus, an effective system will depend not only on a good decision about what technology to introduce, but also on the choice of an effective person or group to implement the technology.

How a telecommunications medium is introduced will be the key to its success. If it is perceived within the organization as another fancy piece of equipment-- a frill-- it is likely to have a much different reception than if it is perceived as a change in the inner workings of the organization. Even in a time of budgetary constraint, for example, it is easy to imagine a human services agency discontinuing its use of videotape for training, but hard to imagine having all the telephones disconnected or the mail deliveries stopped. Telecommunications innovations, such as those considered during this project, must somehow be introduced at the fundamental level of everyday communications--at a basic functional level, such as telephone or mail. Decision makers must be attentive to this need if telecommunications media are to be introduced in a way that can have the greatest impact.

In a field as complex and disjointed as DD, however, consistent patterns are often difficult to identify. There is typically no clear organizational structure. Rather, there are aggregates of groups providing different services. These separate activities are sometimes in harmony with one another, but may often be discordant. Each activity often has its own mode of operation.

Introducing a new communications medium in such an environment is not a straightforward task. Innovation in a patchwork organization requires a complementary patchwork of specific actions. Most likely, some parts will be ready for a change while others will not. They will change at different rates. Strategies that work well in one group may not work well in another.

Over the long term, integration of telecommunications options within the DD field--preferably through gradual and well-monitored processes--seems both desirable, efficient, and cost effective. In the short term, incentives are necessary to encourage the many public and private DD organizations to explore and evaluate uses of telecommunications. The best strategy seems to be the gradual introduction of telecommunication services, tracked and evaluated in terms of user acceptance and feedback.

Moving to specific evaluations of effectiveness, as documented in this project, the evidence is not clearcut. If evidence of *direct* impact on people with developmental disabilities is needed, the evidence from this project is weak. Indeed, the evaluation measures that were used were simply not precise enough to offer quantitative evidence. Certainly specific examples emerged, such as the uses of the personal computers. But most of the impacts shown in this project were indirect, through persons working with developmentally disabled people.

Looking at telecommunications in terms of providing immediate direct benefit to clients, however, may be an overambitious goal. Those who work directly with DD persons with severe handicaps have pointed out how difficult change and improvements are. This is not to say there is not a role for telecommunications use directly with clients. It suggests, however, that a greater early pay-off may come from supporting groups and organizations relating to or serving DD clients. There are multiple layers of public and private organizations working in this field who have intra as well as interorganizational communication needs. Some of them are in a better position to purchase communication services than others. Yet, if the experience in Vermont is any indication, there is a great need for cross-communication and sharing of resources. Telecommunications may be a catalyst for encouraging this kind of communication. It will not make communication happen, if it is not ready to happen; but it can facilitate the process.

Another project criterion of effectiveness was having ideas or aspects of the project adopted and tried elsewhere. While there are examples of interest and planning involving telecommunications that are in part based on the Vermont experience, it is still too early to gauge whether this demonstration will be the impetus for successful implementation elsewhere. It is fair to say, however, that the first stage in transferring project ideas to other settings is taking place. At the time of this writing, the John F. Kennedy Institute at Johns Hopkins University plans to inaugurate an audio conference service designed to reach low income parents of crippled children throughout the state of Maryland. Initially, experts in Baltimore will use the system to meet with generic service providers in other parts of the state via audio conferencing. A goal is to facilitate the process by which crippled children get individual service plans. The plans for this service are being developed with the Vermont experience as a model.

One area where the project team sought effectiveness improvements, but they did not occur, involved the use of telecommunicatons to bring outside expertise into Vermont. The one application that attempted to do so, the computer conferencing trial, did not succeed. The intrastate network and interstate networks established as a result of the project met different needs. The use of telecommunications to facilitate sharing of resources among the states for training, consultation, and so forth, did not happen in this project. It may well evolve in that direction. For example, the bulletin board established as part of the personal computer application is beginning to attract participants from other parts of the country.

Regional consortia, ad hoc networks, and special telecommunication seminars need stimulation and seed money. To promote greater sharing of services from one state to another, there needs to be systematic efforts at promoting regional and national seminars at which expertise from one state can be brought to others at relatively low cost. The electronic mail network established in this project is a beginning effort at stimulating and promoting the sharing of ideas and information via interstate networks. Initially simply a network for UAPs, it has recently included a number of state DD councils. One could imagine a national electronic mail network and regional subgroups that included all the major DD training, research, and service groups. Further, an equivalent undernetwork could be created for DD organizations at the state or local level. For a field where resources are severely taxed and overstretched already, telecommunications offers an opportunity for making more efficient use of those resources at the local, state, regional, and national levels. But there need to be strong incentives; it will not just happen, even if a new telecommunications system makes it technically possible.

It is worth noting that particular geographic areas may not have sufficient DD user organizations to support a special telecommunications service. Yet, there may be other human service organizations that would be interested in forming or joining a human service telecommunication cooperative. This orientation may, in fact, be a more prudent approach to planning telecommunication services in general. The wider the base of support at the outset, the greater the likelihood of a viable service.

Affordability

The implementation cost sections throughout this report have already presented the accounting evidence that the technologies used in these demonstrations were affordable by most DD organizations. In spite of the novelty of the applications, they used low-cost equipment. Decision makers in the DD field should find the price tag for these options appealing, for example, when compared to the rapidly escalating costs of travel. Yet, there is a caveat: The primary costs of innovation are not in the technology. That is, successful innovation of even inexpensive technology requires additional, often hidden expense. AMC invested considerable time and resources in community organizing and other basic groundwork activities. From outside the project, others contributed additional time in planning and implementing applications. This investment far surpassed the cost of the equipment. There is no easy ratio of hardware to all the other costs, yet the basic conclusion is clear: Even the introduction of low-cost technology requires a serious commitment of staff and resources. DD groups may well have to join forces with other human services groups to organize affordable, ongoing telecommunications services.

Some of the applications have a seductive appeal. The technology is cheap and generally available. It is tempting simply to reach for a requisition slip, order a package, and tell the staff to use telecommunications more and travel less-- or some variation on this theme.

While there is no fixed rule on how best to implement these systems, it can generally be assumed to be far more complicated than it seems. To take full advantage of various telecommunication options, assume that an investment in staff time and resources will be needed to ensure that the technology has the best possible chance of meeting an organization's intended objectives.

In general, the project experience suggests the following: 1) Users already burdened with a heavy travel schedule appreciate any reduction as a result of teleconferencing. 2) Service providers felt the less time they could spend traveling, the more time they would have to spend with clients. 3) Start-up costs are substantial.

Telecommunication is not a remedy for an already overstretched budget, but it can help promote improved cost-effectiveness over the long run. There are no organizations in Vermont that have achieved major budget turnarounds as a direct result of increased use of telecommunications. Some have achieved partial savings as a result of decreased travel. In most instances it is difficult to say what, if any, savings have occurred because many of these electronic meetings might not have taken place were it not for the electronic linkage.

Justifying the introduction of telecommunication services solely on assumed budget savings can be both misplaced and misleading. Cost effective uses of telecommunication may occur and indeed should be encouraged, but it is probably a good idea to be suspicious of rosy budget reduction expectations.

Raising expectations too high in terms of what savings telecommunications may accomplish can lead to system rejection and user frustration. It can also provide grist for those who would like to see a project fail. This does not mean that the technology cannot be cost accountable. It does mean, however, that narrow "bean-counting" approaches that require quick paybacks during early shakedown periods are simply unrealistic.

If the nonprofit telecommunications organization formed in Vermont as a result of the project does not succeed--its future was uncertain at the time of this writing--then it will be clear that the service was not financially viable in the Vermont setting, even with all of the nurturing and organizing provided by the project team. There is a good chance it will succeed in providing service to the DD community. That possibility needs adequate time to be fairly tested. If it succeeds, it offers an attractive model for other states, UAP, and DD councils to consider in beginning a service specially tailored to human service groups. Even if it does not succeed, there is strong evidence that it is a model worthy of being tried elsewhere.

Accessibility

Accessibility is not an easy notion to define in the DD world, since what is accessible to some people may not be to others. There is also the issue of perceived accessibility; even a service that is technically accessible may not be perceived as accessible by the intended users.

By most reasonable definitions, these demonstrations achieved accessibility--both in practice and perception by the intended users. The audio system was the most accessible. It is simple to operate, does not require specialists, is user friendly, and is easily adaptable to varied groups. Even in a state with eight different telephone companies, it was possible, though sometimes risky, to link sites from all corners of the state. People participated in planning meetings, parent conferences, and training sessions, from homes, schools, offices, and phone booths. The ease of access and widespread availability of the telephone network provides a promising building block for innovations that extend beyond what the network currently does.

A temptation in planning and funding circles is to think of telecommunications only in terms of two-way video teleconferencing via satellite. That glamorous and expensive image has delayed many groups from attempting to innovate. Policymakers could probably get more for their dollar investments in less ambitious and inexpensive applications of technology than what has been shown to be possible with high-priced and often out-of-reach high technology. After all, nearly every organization has a budget item for telephone expenses as well as travel. By carefully tracking these budget items, it is possible to make a case for expanded telephone use with some travel reductions. Such a case is much easier to present than a rationale for implementing an elaborate new technology. The more down-to-earth options also promise, at least in the short term, considerably more accessibility for users in the DD world.

Accessibility also correlates with the technical usability of a new system. The first criterion is: Does it work? The second: Does it work easily? In the audio demonstrations, the system typically worked easily, though there were moments when it did not work at all. Fortunately, these technical problems did not seem to be a serious deterrent to use. The technical problems with the bridge and with users learning how to cope with the peculiarities of different amplified telephone systems contributed to frustration and anxiety among users at various times during the project. The bridge, for example, would "lock out" or not accept callers or disconnect a group in the middle of a call. Aware of the trial-and-error nature of the project, the users were highly tolerant of such problems. They endured these early constraints and were able to continue to use the systems. Technical problems are, of course, to be expected in demonstrations, and such problems do occur even with established systems. Yet, with the relatively simple technology of the telephone, one might expect such problems to be minimal.

It is probably safe to assume that any technology will bring with it a set of problems--even relatively simple technologies. What this means for policymakers is that initial users should be "failure tolerant." Of course, bugs need to be worked out of systems as early as possible. The Vermont experience also points out the need for educating and encouraging local telephone companies in developing audio conferencing capabilities. The experience of dealing with phone companies and deciding on equipment options has been documented already in the project.* The state of the art in both audio and text-based communication is changing rapidly. Deciding on systems and configurations can be a difficult process. The evolution of the AAUAP's interest and knowledge about telecommunications, as well as increased capabilities and expertise in DD regional centers, offers additional resources for new users.

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*See Eileen Connell's Establishing a Telephone Conferencing System: The Dynamics of Doing It, a paper prepared for the 1980 National Teleconferencing Conference, Houston, Texas, Institute for the Future, September 1980.

Do These Demonstrations Make It Easier for Others?

Decision makers will obviously want to know if the same type of effort that went into these demonstrations would also be necessary for future efforts. After all, there was a major investment or organizational effort in Vermont by very experienced people. Will the next time be any easier?

Our judgment is that it will be easier in the future, but there will be a substantial portion of the organizational effort that will still be necessary for at least the foreseeable future.

These demonstrations provide a model. If other groups look closely at the model, they are bound to save themselves time, effort, and pain. Also, a significant portion of the AMC effort in this project went into exploring possibilities that were eventually rejected as demonstrations. Thus, decision makers who begin with specific needs are not likely to need as much exploratory time. The existence of successful ventures, such as Vermont, should also help. There will not be as much need to convince others that it is possible for new systems like this to work.

Groups trying to build on the experience of these demonstrations will not, however, have the firsthand experience to guide them. It is likely that less experienced groups than AMC will be in charge of these new efforts. Certainly such groups will have to allow time for learnings of their own. It is also true that innovations are bound to come slowly and will always take patient nurturing. That will not change because of these demonstrations.

Broader Policy Issues

The conclusions above summarize what this project has made obvious: Telecommunications media can be effective, affordable, and accessible tools for DD people and those who work with them. Even the obvious, however, does not always become a part of policy for federal, state, or private funding agencies. What sort of policies are suggested by the results of this project?

It is important to recognize that the current situation is haphazard at best. There are a few persons at agencies funding DD work that are well informed about the strengths and weaknesses of telecommunications options. There are pockets of interest and expertise. But telecommunications literacy is, in our experience, rare in the DD world. At the UAPs, for example, we saw considerable expertise in audiovisual and instructional technology. But interactive telecommunications media, such as those demonstrated in this project, are from another family of systems and approaches to system use. The situation in funding agencies is typically worse than what we encountered at UAPs. Most funders of DD work, we suspect, would not be able to recognize even the most obvious telecommunications opportunities.

There is a cadre of experienced and talented people in various federal government agencies who have been involved in numerous telecommunications projects and are frequent proposal reviewers. But these persons are spread among agencies and have had only limited opportunities to contribute to DD.

A program to educate agency personnel regarding telecommunications options and the use and potential misuse in DD would be one starting point. The use of telecommunications could probably be built into a number of projects, if decision makers were well informed. In many cases, the costs of such projects would be equal to or lower than conventional approaches--especially if they are developed early in the life of a new venture. The impacts could be many. This option would aggressively educate decision makers regarding telecommunications options, as well as specific areas where they might be most usefully employed in the DD field.

A key issue here would be whether to emphasize telecommunications per se, or to continue to emphasize substantive DD topics that would simply use telecommunications as appropriate. Experience to date suggests that specialized telecommunications programs may be less desirable. Telecommunications provides a medium, but it should not become the subject matter itself--particularly if it does so with decreased emphasis on the DD topic involved.

Of course, DD agencies could go beyond education to providing some sort of specialized service to DD user groups. For instance, audio conferencing bridges could be established in regions where DD activities clustered. DD agencies could work together with other human service agencies to provide telecommunications services. Computer conferencing or electronic mail services could also be provided, perhaps through bulk purchasing arrangements with commercial service providers. A working arrangement with the General Services Administration (GSA) could provide this service at the federal level, since GSA already has some such services available. This option would extend the range of these services and gear them directly toward the needs of DD groups.

The experience of this project suggests that stimulating interest in telecommunications opportunities--without overselling the technology--is very important; it is questionable that a groundswell of intelligent interest will simply appear in so harried a world as DD. Also, the telecommunications marketplace is a source of concern, since the needs of DD are not likely to be a major source of revenue for vendors. Thus, existing telecommunications opportunities may have to be reframed in the language and priorities of DD. When applications are chosen, commercial providers may not have the right service at the best price. There is a need to stimulate service providers to look at opportunities in the human services and specifically in the DD area. New models, such as the telecommunications cooperative formed in Vermont, may be needed to provide specialized and in some cases subsidized services to the DD community.

The current funding climate for human services may not be the sort of climate where innovations are very likely. Still, there are many opportunities where even small-scale investments can lead to large payoffs. The experience of this project provides the basis for a legitimate hope that telecommunications media can make a difference in the lives of DD people. The project also provides a tone of humility for such efforts, a reminder that these are not easy answers, though answers they are.

APPENDIX 1:

Consumer and Community Groups Evaluation Data

The following pages include evaluation information collected on audio conferencing use by DD consumer and community groups in Vermont. It includes

1. A list of questions used in telephone interviews with group leaders
2. Questions and numerical results from a March 1980 survey of audio conferencing users from the Vermont Association of Retarded Citizens (VARC) and the Vermont Surrogate Parent Program (VSPP)
3. Questions and numerical results from a December 1980 survey of audio conferencing users from VARC and VSPP
4. Questions and numerical results from a February 1981 survey (on the overall impact of the telecommunications project) of members of the Vermont Developmental Disabilities Council
5. A list of members of the Consumer Applications Advisory Group formed by the Administrative Policy Committee of the Center for Developmental Disabilities.
6. A sample copy of the log-sheet completed by group leaders following each conference call.

TELEPHONE INTERVIEW QUESTIONS

1. Compared to a face-to-face meeting, does organizing the audio conferences take you:

    ____ Much less time?

    ____ Less time?

    ____ About the same time?

    ____ More time?

    ____ Much more time?

2. Do you usually send out an agenda or other background material before the audio conferences?

    ____ Yes
    ____ No

3. Are there any topics you don't put on your agenda because you are meeting over the phone rather than face-to-face?

    ____ Yes
    ____ No

    If yes, why?

4. Did you have to make any significant changes in your style of conducting meetings because of the audio conferencing system?

    ____ Yes
    ____ No

    If yes, please describe.

5. Before your group began using the audio conferences, did these particular people meet each other

    ____ Much more often?

    ____ More often?

    ____ About the same?

    ____ Less often?

    ____ Much less often?

6. What kinds of things have you found the conferences useful for?

7. What do you see as some of the problems with audio conferences for your group's activities?

8. What kinds of things would you suggest as possible changes in the way the conferences are used by your group?

9. Do you have some questions you'd like to ask or other comments about the conferences that haven't been covered so far?

VERMONT TELECOMMUNICATIONS QUESTIONNAIRE
VARC: N = 11
VSPP (in parentheses): N = 7

1. In how many group telephone meetings have you participated (between December 1979 - March 31, 1980)?

2. In order to participate in these conferences, did you use

_____ a speakerphone?

or

_____ your own telephone?

3. If you used a speakerphone, did you have any problems related to the operation of this equipment?

3 (4) Yes

7 (1) No

If yes, please describe:

4. Overall, how would you rate the VARC/VSPP telephone conferences in which you participated on a scale of 1 to 5, with 1 being very good and 5 being very poor.

5 (1) 1 Very Good

1 (6)

4

1

_____ 5 Very Poor

5. In general, did you feel these telephone conferences were

____ Much too long?

2 (2) Too long?

9 (5) About the right length?

____ Too short?

____ Much too short?

6. On a scale of 1 to 5, 1 being very good and 5 being very poor, how would you rate the group leader's performance during the telephone conferences?

7 (5) 1 Very Good

2 (2)

1 ____

____

____ 5 Very Poor

7. In what ways would you like to see the group leader's methods or style changed?

8. Thinking back over your experience thus far with telephone conferencing, how often did you feel . . .

	Always	Almost Always	Sometimes	Almost Never	Never
constrained in the types of contributions you could make?		2	7	1	(2)
overloaded with information?		2	5 (4)	4 (2)	1 (1)
able to express your views	(2)	7 (2)	3 (3)	1	
able to get an impression of personal contact with the other participants in the conference?	(2)	6 (3)	3 (1)	(1)	2

9. In what ways did you feel the telephone conferences were especially effective?

10. In what ways did you feel the telephone conferences were especially ineffective?

11. If the telephone conferencing system had not been available, what alternatives could have been used successfully?

8 (3) Face-to-face meeting?

6 (4) Information mailed to you?

2 (4) One-to-one phone calls from the group leader or another participant?

4 (4) Communications could not have occurred without telephone conference.

_____ Any others?

12. Do you feel that these telephone conferences have affected your work or the work of other VARC/VSPP members?

10 (6) Yes

1 No

13. Can you name any specific benefits that have resulted from your participation in these calls?

9 (6) Yes

2 No

If yes, please describe:

14. Do you have any other comments you'd like to add or question/issues you would like to see addressed?

____

Name (Optional)*

*You are not required to sign your name to this questionnaire. If you do so, it will provide a reference for the researchers, but any responses you give will be kept entirely confidential.

VERMONT TELECOMMUNICATIONS QUESTIONNAIRE (II)
VARC: N=10
VSPP (in parenthesis): N=6

1. Overall, how would you rate the VARC/VSPP telephone meetings in which you participated between April 1 and December 1, 1980?

Very good				Very poor
5 (2)	3 (3)	2 (1)		
1	2	3	4	5

2. Overall, did you feel these telephone meetings were:

____ Much too long?

1 (2) Too long?

8 (4) About the right length?

____ Too short?

____ Much too short?

3. Overall, how would you rate the leadership of the telephone meetings?

Very good				Very poor
6 (1)	1 (5)	3		
1	2	3	4	5

4. Would you like to see the group leader's methods or style changed in any way?

4 (1) Yes

6 (4) No

If yes, how?

5. Thinking back over your experience thus far with telephone meetings, how often did you feel:

	Always	Almost Always	Sometimes	Almost Never	Never
Constrained in the types of contributions you could make?		2 (1)	3 (5)	4	1
Overloaded with information?		1 (2)	2 (1)	5 (3)	2
Able to express your views?	3 (1)	4 (3)	3 (1)	(1)	
Able to get an impression of personal contact with other participants in the meeting?		4 (3)	4 (2)	2 (1)	
Bored?			1 (2)	5 (3)	4

6. Since July, a new dial-up arrangement has been available for your telephone meetings in place of the operator-assisted system. On a scale of 1 to 5, with 1 being much better and 5 being much worse, please compare the new dial-up arrangement to the operator-assisted arrangement in terms of:

	Dial-up Much Better 1	Better 2	Same 3	Worse 4	Dial-up Much Worse 5
Ease of access (calling in rather than being called by an operator)	6 (4)	1 (2)			
Time needed to start the meeting	5 (3)	2 (2)	(1)		
Availability of assistance when problems are encountered during a meeting	2	(1)	2 (1)	2 (1)	
Sound quality	2	2 (4)	2	1	(1)

7. Overall, which of these two arrangements do you prefer?

7 (6) Dial-up

____ Operator-assisted

Why do you prefer that arrangement?

8. In what ways do you feel the use of audio conferencing has affected VARC/VSPP? Please consider the following broad categories and tell us whether audio conferencing has made any difference in the functioning of your organization.

	Much Improved		No Change		Much Worse
Communications	6 (1)	3 (3)	(1)		
Quality of member participation	4	3 (2)	1 (1)	(1)	
Travel schedule	8 (2)	(1)	(1)		
Training	4	6 (2)	(2)	(1)	
Utilization of outside resources	3 (1)	5 (3)		(1)	
Decision making	4 (2)	2 (2)	3		(1)
Quick response to problems	5	3 (3)	1 (2)		
Achievement of organizational goals	6	2 (4)	1	(1)	

9. Based upon your experience thus far, do you feel that there are any disadvantages for your group in using telephone meetings?

1 (3) Yes

8 (3) No

If yes, please describe:

10. Given the following four choices involving your group's use of telephone meetings, which would you prefer?

2 (1) Schedule more telephone meetings
_____ Schedule fewer telephone meetings
7 (4) Continue telephone meetings at the present rate
(1) Discontinue use of telephone meetings

11. In your opinion, what types of meetings can be conducted most effectively by telephone?

12. For the types of telephone meetings your group has been having, what is the maximum number of participants who could be involved while maintaining an effective meeting?

____

Why?

13. About how many group telephone meetings did you participate in between April 1 and December 1, 1980?

____

14. Feel free to add here any other comments regarding your experience with telephone meetings.

Vermont Developmental Disabilities Council Questionnaire

February 1981

N = 23

The purpose of this questionnaire is to help evaluate the impact of telecommunications on the role and operation of the DD Council. We appreciate your assistance in completing the entire questionnaire whether or not you have been a participant in any of the Vermont telecommunications demonstrations.

1. Please check the category of Council membership that best describes you:

1 chairperson

4 state agency representative

11 consumer

4 voluntary agency

3 other (please specify) ______________________

2. How long have you served on the Council

1 less than 1 year

11 1-2 years

5 3-5 years

5 over 5 years

3. Are you a person with a developmental disability?

3 yes

19 no

4. What has been your involvement in the following activities of the telecommunications project?

	participant	advisor	generally familiar	no involvement
audio conferencing ("bridge")	15	1	2	4
computer conferencing ("EIES")	2	1	4	10
personal computers ("Apples")		1	8	7

5. Have you ever participated in a DD Council audio conference during this demonstration project?

12 yes

8 no (skip to #6)

a. If yes, for what purposes?

b. Approximately how many times?

c. Overall, please rate the DD Council audio conferences you participated in according to the scale below.

Very Good				Very Poor
6	4	1	1	

6. Please consider the following broad categories and tell us whether audio conferencing has made any difference in the functioning of your organization.

	Much Improved		No Change		Much Worse
Communications	8	6	6		
Quality of member participation	5	5	8		
Travel schedule	12	3	4		
Utilization of outside resources	4	1	13		
Decision making	7	3	8		
Quick response to problems	7	3	9		
Achievement of organizational goals	6	3	10		

a. In what other ways do you feel the use of audio conferencing has affected the Vermont DD Council?

7. Do you feel that the frequency of audio conferencing usage by the Council over the past year has been

____ too much?

10 about right?

6 too little use?

8. Looking at the project as a whole, please indicate on the scale below how you think the introduction of telecommunications has affected the DD Council's work in each of the following areas.

	Very Positive				Very Negative
Program development	5	5	5	1	
Planning	8	6	3		
Administration	4	9	3		
Consumer relations	3	6	6	1	1
State agency relations	4	3	7	1	1
Information dissemination	6	5	4	1	1

9. Do you believe the use of telecommunications should be an integral component of DD Council work in Vermont?

18 yes

2 no

1 not sure

Please comment on your answer.

10. In which of the following areas do you think telecommunications media can best contribute to the Council's work? (You may check more than one category.)

12 program development

14 planning

13 administration

10 consumer relations

10 state agency relations

13 information dissemination

11. Are there uses of telecommunications you would like to see tried by the Council that have not yet been attempted?

6 yes

8 no

If yes, please give us some examples.

12. The Vermont DD Council authorized your Executive Secretary to spend up to 40 percent of his time to assist in the planning, development, and operation of the telecommunications project. Judge the overall impact his involvement had on his ability to carry out his responsibilities to the Council.

13 enhanced his ability

4 made no difference

2 impaired his ability

13. Would you recommend the use of telecommunications by other DD Councils in other states?

18 yes

3 no

a. Why?

b. Would you be willing to use telecommunications in your DD Council work on a continued basis?

18 yes

2 no

If yes, please describe how you would like to use it.

14. Do you have any additional comments or reactions to the use of telecommunications in DD Council work?

ADVISORY BOARD

APC Telecommunications Advisory Committee on Consumer and Community Group Applications:

Ellie Guerrera
Barry Bernstein
Peg Franzen
Harold Somers
Jerry Tillotson
Lee Viets
Steve Chupack
Gail Wickes
Bill Mazer
Frank McNeil

SAMPLE
CONFERENCE CALL LOG-SHEET

Initiator(s) ______________________ Date ______________

Organization ______________________ Time 1) Start ________

Location ____________ Phone ____________ 2) Finish ________

FOR OFFICE USE ONLY

Call place via: Handled by: ____________

Telepatcher Bridge (UVM) ____

Meet Me Bridge (Montpelier) ___

Other ______________ Cost of call: __________

APPLICATION

____ I-Team

____ Assocation of Retarded Citizens

____ Surrogate Parent Program

____ Vt. Center for Independent Living

____ United Disabled People of Vermont

____ Vermont DD Council

____ Other (please specify)

____

PLEASE USE THIS AS AN AID IN SETTING UP YOUR CONFERENCE

PARTICIPANTS (if there is more than one person at a given location, please note):

NAME	LOCATION (town)	PHONE

CENTRAL MEETING PLACE (where you might all have met) ____________________

PRIMARY PURPOSE(S):

____	Information sharing	____	Training
____	Decision making	____	Other

COMMENTS:

TECHNICAL PROBLEMS:

OVERALL COMMENTS:

*ROUND TRIP MILEAGE from home base to most likely meeting site for all participants had the meeting been held face-to-face: ____________________

Cost @ .17 mi. = ____________________

Summary prepared by ______________________________

Date ______________

*Example: A 3-party conference between 1 person in Burlington, 2 in Montpelier, and 1 in St. Johnsbury. Their "most likely meeting site" being Burlington.

Round trip mileage Montpelier/Burlington:	80 mi. x 2 persons	=	160 miles
Round trip mileage St. Johnsbury/Burlington:	175 mi. x 1 person	=	175 miles
	TOTAL ROUND TRIP MILEAGE	=	335 miles

APPENDIX 2:

Professional Groups' Evaluation Data

Following are questions and numerical results from a February 1981 survey of members of the State Interdisciplinary Team for Intensive Special Education (I-Team).

TELECOMMUNICATIONS QUESTIONNAIRE

State Interdisciplinary Team for
Intensive Special Education (I-Team)

February 1981
N = 9

The purpose of this questionnaire is to help evaluate the impact of telecommunications on the operation and effectiveness of the I-Team. We appreciate your assistance in completing the entire questionnaire whether or not you have been a participant in any of the demonstration activities.

1. Overall, how would you rate the I-Team's use of audio conferencing to date?

very good				very poor
2	5	2		

2. In general, how helpful do you think audio conferencing has been in assisting the I-Team meet its objectives?

very helpful				not helpful
3	5	1	___	___

3. Have you participated in any I-Team audio conferences during this demonstration project?

9 yes

_____ no (skip to #4)

a. If yes, for what purposes?

b. Approximately how many times?

4. For which I-Team services do you think audio conferencing is most useful?

	very useful				not useful
	5	4	3	2	1
Assessment	2		1	2	4
IEP Development	2		4	3	
Placement	1		5	1	1
Specific Instructional Programs	2	2	4	1	
Medical Concerns	4	4			1
Curriculum Needs	1	3	3		
Consulting with Parents and Teachers	5	4			
Support and Encouragement	6	2			

5. Did the actual use of audio conferencing by the I-Team meet your original expectations?

2 was what I expected

6 was better than I expected

____ was worse than I expected

1 didn't know what to expect

Why?

6. Do you feel that the frequency of audio conference usage by the I-Team has been

____ too much?

5 about right?

4 too little?

7. Please consider the following broad categories and tell us whether audio conferencing has made any difference in the functioning of the I-Team.

	Much Improved		No Change		Much Worse
Communications	2	6	1		
Quality of member participation	2	2	4		
Travel schedule	6	3			
Utilization of outside resources	1	6	1		
Decision making		6	3		
Quick response to problems	5	2	2		
Achievement of organizational goals		9			

a. In what other ways do you feel the use of audio conferencing has affected the I-Team?

8. In using audio conferencing for I-Team work, what problem areas concern you the most?

	very concerned				not concerned
Technical	1	3	1	1	3
Impersonal			3	2	4
Privacy/security	1	2	3	2	3
Cost	1		1	2	3
Audio only (lack of visual cues)	2		4	1	2

9. Are there any other problem areas for which you would be "very concerned"?

1 yes

8 no

If yes, please explain.

10. Do you believe the use of audio conferencing should be an integral component of I-Team work in the future?

9 yes

____ no

____ not sure

Please comment on your answer.

11. Besides the uses of audio conferencing tried thus far, are there other uses of telecommunications for I-Team work you would like to see tried?

4 yes

3 no

If yes, can you cite examples?

12. As an I-Team member, have you ever initiated use of the audio conferencing system for a special purpose?

4 yes

5 no

If yes, please describe your experience.

13. Do you have any additional comments or reactions to the use of telecommunications in I-Team work?

14. What is your job title?

15. How long have you been on the I-Team?

Please return to:

I-Team Questionnaire
Institute for the Future
2740 Sand Hill
Menlo Park, California 94025

APPENDIX 3:

Content Analysis of Audio Conferences

This appendix contains a description of the methodology and a summary chart of the coding information that resulted from a content analysis of selected telephone conferences held during the audio conferencing demonstration.

CONTENT ANALYSIS OF AUDIO CONFERENCES

Purpose

To identify the range of meeting types conducted via the audio conferencing systems used in the Vermont demonstration.

Meeting Samples Used for Analysis

Beginning early in the demonstration, AMC audio-taped many of the telephone conferences held. Taping began during the early calls and continued intermittently throughout the demonstration period. The Institute for the Future made an effort (during November and December of 1980) to collect additional meeting samples by attempting to record all calls that occurred immediately following AMC's completion of its demonstration activities. In all, over 60 meetings involving at least 15 different groups were recorded.

From this pool of audio tapes, we chose tapes of meetings held during two different two-month periods: March/April 1980 and November/December 1980. These periods were chosen for analysis in order to identify a manageable sample of meetings held prior to the installation of the meet-me bridge and several months after. A little over half of all the 60 meetings on audio tape were used in our sample.

For the first period (March/April), 35 meetings occurred over two different conferencing systems. More than half of these meetings were taped. All of the resulting tapes were used (19) for analysis. During the second period (November/December), 28 conference calls were held by various groups via the meet-me bridge. Although over sixty percent of these calls were taped, only 13 meetings (45% of all meetings held) were of sufficient sound quality for analysis.

Our content analysis included the 19 tapes from the first period and 13 tapes from the second period--a total of 32 meetings held by 14 different user groups over three different audio conferencing systems.

Additional Information

In addition to the audio tapes of these meetings, other supporting material was available for most of the calls. The information included meeting duration, names and locations of each participant, the assumed group leader, reports of technical problems, the purpose of the meeting, and, often, a synopsis of the discussion prepared by the group leader.

This information was obtained from participant log sheets and usage records from Vermont Telecommunications, Inc.

Methodology

Our initial assumption was that distinct meeting types were recognizable and could be categorized based upon three general meeting elements. These included (1) the distribution of participation by group members, (2) the degree for formality inherent in the conduct of the meeting, and (3) the degree of control exhibited by the group leader.

We identified certain meeting attributes that we considered observable indicators of these three elements. Below is a chart that lists these indicators and shows their relationship to each of the three meeting elements.

Meeting Element		Indicators	
1.	Distribtution of participation	a)	The number of distribution of topical utterances among participants.
		b)	The number and distribution of prompts (inducements for further comment, such as questions, or initiations of new topics).
2.	Degree of Formality	a)	Agenda pre-set, prepared on-line, or omitted altogether?
		b)	Is there an identifiable "presenter" of information not readily available to the other participants?
		c)	Is there an identifiable question-and-answer period?

	d)	Are important supporting documents used in conjunction with the group call?
Degree of formality (continued)	e)	are there many brief, non-topical utterances? (e.g., "uh-huh, "yeah," "okay," etc.)
Degree of control by leader/moderator	a)	what proportion of topical utterances are made by the leader?
	b)	what proportion of prompts are made by leader?
	c)	how does the leader handle participant questions on a presentation, a distinct period set aside, or can the speaker be interrupted with questions and comments from participant?

The above indicators were used to develop a simple checklist for coding each meeting tape. Space was also provided on the coding sheets for noting any technical problems encountered during the meetings (only those referred to by participants as a "problem") and how they were handled, as well as any comments made related to an assessment of the conferencing medium being used. Although three different coders were used to pre-test the coding format and protocols, the 32 meetings subsequently analyzed were all coded by one individual.

The resulting coding information was used to develop a simple typology of the meetings based upon both quantitative and qualitative distinctions in the three meeting elements. The following charts show coding information from the 32 meetings analyzed.

ANALYSIS OF CODING INFORMATION

Group and Date **March-April 1980**	Utterances/ Minute	PARTICIPATION Utterances/ Minute/ Person	Utterances/ Minute/ Site	% Prompts/ Utterance	Agenda	FORMALITY Presenter(s)	Nontopical Utterances	Supporting Material	% Utterances by Leader	% Prompts by Leader	LEADERSHIP Question/ Answer Period	Type
DD Council (504) 4/3/80	(4.6) Medium	(1.5) High	(1.5) High	(24%) Medium	On-line	Yes	Few	No	(33%) Low	(64%) Medium	No	Structured Discussion
DD Council (504) 4/25	(2.9) Low	(.6) Low	(.6) Low	(31%) Medium	On-line	Yes	Some	No	(31%) Low	(63%) Medium	No	Structured Discussion
DD Council (504) 3/21	(2.8) Low	(.6) Low	(.6) Low	(28%) Medium	On-line	Yes	Few	No	(44%) Medium	(70%) Medium	No	Structured Discussion
DD Council 3/11	(2.2) Low	(.7) Low	(.7) Low	(46%) High	On-line	Yes	Some	No	(36%) Low	(25%) Low	No	Structured Discussion
UAF/BTS 3/24	(6.5) High	(1.6) High	(1.6) High	(34%) Medium	None	No	Some	No	(36%) Low	(55%) Medium	No	Informal Discussion
UAF/BTS 3/14	(5.0) High	(1.3) High	(1.7) High	(35%) Medium	None	Yes	Many	No	(50%) High	(61%) Medium	No	Informal Discussion
Parents Network 3/17	(1.7) Low	(.07) Low	(.15) Low	(40%) High	Pre-set	Yes	Few	No	(66%) High	(68%) Medium	Yes	Presentation
UDPV 3/27	(3.7) Low	(.7) Low	(.7) Low	(24%) Low	On-line	No	Some	No	(44%) Medium	(36%) Low	No	Informal Discussion
VCIL 3/20	(1.6) Low	(.2) Low	(.2) Low	(30%) Medium	Pre-set	Yes	Few	Yes	(33%) Low	(61%) Medium	Yes	Presentation
VCIL 3/12	(4.0) Medium	(1.0) Medium	(1.0) Medium	(25%) Low	On-line	No	Some	No	(38%) Low	(53%) Medium	No	Structured Discussion

	PARTICIPATION				FORMALITY				LEADERSHIP			
Group & Date	Utterances/ Minute	Utterances/ Minute/ Person	Utterances/ Minute/ Site	% Prompts/ Utterance	Agenda	Presenter(s)	Nontopical Utterances	Supporting Material	% Utterances by Leader	% Prompts by Leader	Question/ Answer Period	Type
VSPP 3/28	(3.3) Low	(.4) Low	(.5) Low	(33%) Medium	Pre-set	Yes	Few	No	(38%) Low	(64%) Medium	Yes	Presentation
VARC 4/14	(4.1) Medium	(1.0) Medium	(1.0) Medium	(24%) Low	On-line	No	Some	Yes	(30%) Low	(34%) Low	No	Structured Discussion
Franklin Co. 4/1	(4.9) Medium	(.98) Medium	(.98) Medium	(11%) Low	None	No	Many	No	(52%) High	(38%) Low	No	Structured Discussion
Franklin Co. 3/31	(8.2) High	(1.6) High	(1.6) High	(25%) Low	None	No	Many	No	(50%) High	(83%) High	No	Informal Discussion
Franklin Co. 3/24	(3.3) Low	(.8) Medium	(.8) Low	(30%) Medium	None	No	Some	No	(53%) High	(29%) Low	No	Structured Discussion
Franklin Co. 3/17	(5.3) High	(1.3) High	(1.3) High	(9%) Low	None	No	Many	No	(45%) Medium	(88%) High	No	Informal Discussion
DD Law 4/9	(2.1) Low	(.4) Low	(.4) Low	(32%) Medium	Pre-set	Yes	Few	Yes	(63%) High	(36%) Low	No	Presentation
UCP 3/12	(3.7) Low	(.9) Medium	(.9) Medium	(25%) Low	Pre-set	Yes	Some	Yes	(42%) Medium	(26%) Low	No	Structured Discussion
I-Team 3/19	(4.7) Medium	(1.6) High	(1.6) High	(17%) Low	None	No	Some	No	(43%) Medium	(25%) Low	No	Structured Discussion

	PARTICIPATION				FORMALITY				LEADERSHIP			
Group & Date November-December 1980	Utterances/ Minute	Utterances/ Minute/ Person	Utterances/ Minute/ Site	% Prompts/ Utterance	Agenda	Presenter(s)	Nontopical Utterances	Supporting Material	% Utterances by Leader	% Prompts by Leader	Question & Answer Period	Type
CARC 11/25	(1.9) Low	(.2) Low	(.3) Low	(23% Low	Pre-set	Yes	Few	No	(45%) Medium	(68%) Medium	Yes	Presentation
CARC 12/22	(2.1) Low	(.4) Low	(.5) Low	(33%) Medium	Pre-set	Yes	Some	No	---	---	Yes	Presentation
LGMPH 12/17	(4.2) Medium	(.7) Low	(.7) Low	(24%) Low	None	No	Few	No	(18%) Low	(19%) Low	No	Informal Discussion
LGMPH 12/23	(5.6) High	(1.4) High	(1.4) High	(13%) Low	None	No	Some	No	(35%) Low	(34%) Low	No	Informal Discussion
I-Team 11/25	(4.4) Medium	(.88) Medium	(1.1) Medium	(21%) Low	None	No	Few	No	(43%) Medium	(40%) Low	No	Structured Discussion
I-Team 12/1	(6.3) High	(.9) Medium	(1.1) Medium	(23%) Low	On-line	No	Some	No	(35%) Low	(44%) Low	No	Structured Discussion
I-Team 12/15	(6.4) High	(1.1) Medium	(1.3) High	(24%) Low	On-line	No	Some	No	(36%) Low	(62%) Medium	No	Informal Discussion
Voc. Rehab. 11/17	(4.5) Medium	(.75) Low	(1.1) Medium	(21%) Low	Pre-set	No	Few	No	(24%) Low	(35%) Low	No	Structured Discussion
Voc. Rehab. 11/24	(2.3) Low	(.46) Low	(.46) Low	(21%) Low	Pre-set	Yes	Few	No	(46%) Medium	(64%) High	No	Presentation
Voc. Rehab. 12/1	(2.8) Low	(.56) Low	(.7) Low	(24%) Low	Pre-set	No	Few	No	(48%) High	(85%) High	No	Presentation
Voc. Rehab. 12/28	(3.3) Low	(.55) Low	(.66) Low	(25%) Low	Pre-set	No	Few	No	(49%) High	(56%) Medium	No	Presentation
Voc. Rehab. 12/15	(2.9) Low	(.58) Low	(.58) Low	(32%) Medium	Pre-set	Yes	Few	No	(39%) Low	(54%) Medium	No	Presentation
Dept. Mental Health 12/8	(5.9) High	(.98) Medium	(.98) Medium	(20%) Low	On-line	Yes	Some	Yes	(33%) Low	(59%) Medium	No	Structured Discussion

APPENDIX 4:
Content Analysis of Personal Computer Transcripts

This appendix contains a summary chart of the coding information that resulted from a content analysis of messages exchanged via the bulletin board communication system.

Coding Results

Content Categories:	May/June 1980 Number of Lines of Text Coded	May/June 1980 Percent Of All Text Coded	February/March 1981 Number of Lines of Text Coded	February/March 1981 Percent of All Text Coded
Introductory Exchange	86	14%	---	---
Social Exchange	143	23%	140	27%
Instructional Exchange	78	13%	40	8%
Procedural Exchange	236	39%	193	37%
Inducement	34	6%	16	3%
Request for Assistance	12	2%	106	21%
Feedback/Assessment	22	4%	22	4%
Total lines of Text Coded	611		517	
Directionality of Communication				
1. Participant to Participant	27	4.4%	---	---
2. Participant to Tutor	106	17%	70	14%
3. Participant to Staff (other than tutor)	5	.8%	4	.7%
4. Participant to Outside User	---	---	---	---
5. Participant to All Users	21	3.4%	5	.2%
6. Tutor to Participant	242	39.6%	159	31%
7. Tutor to Tutor	---	---	72	14%
8. Tutor to Staff (other than tutors)	---	---	24	5%
9. Tutor to Other User	---	---	65	13%
10. Tutor to All Users	111	18%	---	---

	May/June 1980		February/March 1981	
	Number of Lines of Text Coded	Percent Of All Text Coded	Number of Lines of Text Coded	Percent of All Text Coded
11. Outside User to Participant	6	.9%	---	---
12. Outside User to Tutor	---	---	52	10%
13. Outside to Other User	---	---	22	4%
14. Outside User to All Users	4	.7	5	.2%
15. Staff to Participant	65	10.6%	8	2%
16. Staff to Tutor	18	2.9%	31	6%
17. Staff to Staff	---	---	---	---
18. Staff to Other User	---	---	---	---
19. Staff to All Users	6	.9%	---	---
Total Lines of Text Coded:	611		517	

APPENDIX 5:

Computer Conferencing Evaluation Data

The following interview schedules were used during telephone interviews with participants in the computer conferencing demonstration. The first-round interviews were held in December 1980, the second-round in April 1981, the third-round August 1981.

First-Round Interview Schedules

1. Background with computers, computer terminals:

2. Typing ability, attitudes toward typing:

3. Reasons for participating in demonstration:
   (Probes: where does participation in this demonstration fit in current priorities?)

4. Hopes for the demonstration:

5. Expectations of what will happen:

Second-Round Interview Schedules

1. How did you think the meeting in Burlington went?

2. What do you now see as the purposes of this demonstration?

3. Why do you think there was not much difficulty in responding to cases in the original format?

4. Have you experienced any problems in using EIES?

5. Have there ever been times when you wanted to say something or ask something in a conference, but felt uncomfortable in doing so? If so, can you tell me about it?

6. How do you decide whether to send a message publically or privately?

Third-Round Interview Schedules

1. What is your overall rating of the demonstration?

Very Good	Good		Poor	Very Poor
1	2	3	4	5

2. What aspects of the demonstration were especially successful?

3. What aspects of the demonstration were especially unsuccessful?

4. Can you identify any specific results of the demonstration?

5. Would you like to see the demonstration continued?

6. Could you justify making funds available to support continued operation of the demonstration?

7. If the demonstration were to be done again, what would you suggest doing differently?

8. Do you feel we had a good balance of participants in the demonstration?

If not, what sorts of people were missing?

9. When did you discontinue using EIES?

APPENDIX 6:

Electronic Mail Evaluation Data

The following questionnaires were administered to electronic mail system users in September 1980. The first questionnaire (4 pages) was completed by system users who actually operated computer terminals. The second questionnaire (1 page) was completed by users who provided information to support message exchange but did not themselves input it into the system.

ELECTRONIC MAIL QUESTIONNAIRE

(Terminal Users)

N = 33

1. Do you type or use other keyboard devices in your work?

Yes 26

No 7

2. How would you rate your typing ability?

1	3	13	12	4
Very Poor	Poor	Adequate	Good	Very Good

3. What type of computer terminal do you use?

Manufacturer ____________

Model Number ____________

4. Have you had any difficulty in using OnTyme?

Yes 15

No 18

5. How much previous experience, if any have you had using computers?

7	19	7
Much	Some	None

6. When you use OnTyme, where is your computer terminal located? (e.g., down the hall, in my office, across the street, the data processing center in the basement, etc.)

Location:

7. Is this location convenient for you?

Yes 29

No 4

8. How helpful was the OnTyme UAP Users Guide?

Very helpful	17
Somewhat helpful	12
Not at all helpful	1
Didn't see it	

9. What type of training do you think new OnTyme users at UAPs will need?

12	Individual instruction, over the phone
9	Individual instruction, in-person
4	Group instruction, over the system
3	Group instruction, in person
24	Self-instruction with user guide
	Other (please specify:

10. Has the Use of OnTyme had any affect on your work patterns?

Yes 20

No 13

If yes, how?

11. How has your use of OnTyme affected your level of contact with colleagues at other UAPs?

More contact	28
Less contact	
No change	5

12. Has your use of OnTyme resulted in more productive communication than you believe would have been possible using:

Conventional mail only	Yes	27	No	6
Telephone calls only	Yes	23	No	10
Face to face meetings only	Yes	15	No	17

If yes, please explain:

13. How satisfactory do you think OnTyme would be for the following activities?

	COMPLETELY UNSATISFACTORY			COMPLETELY SATISFACTORY	
	1	2	3	4	5
Giving or Receiving Information			3	13	17
Problem-solving	1	10	14	6	1
Bargaining	2	13	13	3	1
Decision-Making	2	8	11	9	1
Generating ideas	2	3	6	14	7
Persuasion	3	13	11	4	
Asking Questions			4	12	16
Resolving Disagreements	3	12	15	1	1
Getting to Know Someone	5	11	10	4	2
Giving or Receiving Instructions		3	3	16	10
Maintaining Friendly Relations' ("Staying in Touch")			4	14	14
Exchanging Opinions	1	2	8	11	10
Others (please list)					

14. Would you like to see more UAPs using the OnTyme system?

Yes 30

No 1

Why?

15. What changes, if any, would you like to see in the way OnTyme is used among UAPs?

16. Check the features you consider important in an electronic message system used by UAPs:

32 Ability to exchange messages with specific individuals.

31 Ability to exchange messages with an entire network of users.

31 Ability to exchange messages with specific groups of users.

18 Access to common (statewide) files.

14 Access to group files.

14 Access to private (individual) files.

23 Text editing.

16 Ability to participate with others on-line at the same time (synchronous participation)

____ Others (please list)

17. If you have to pick up the cost* for your use, would you continue to use OnTyme?

*Usage fees for the ______ id have averaged ______/month over the last six months. (This figure includes usage fees only, it does not include the $100/month charge for the entire UAP account.)

Yes 24

No 3

Are there any changes you would make in your usage style (e.g., frequency, content of messages, whom you would exchange messages with, etc.)?

Yes	12
No	16

If yes, what changes?

ELECTRONIC MAIL QUESTIONNAIRE
(Nonterminal Users)
N = 14

1. How has your use of OnTyme affected your level of contact with colleagues at other UAPs?

More contact 9
Less contact ____
No change 4

2. Has using OnTyme directly affected your work?

Yes 8
No 5

3. Would you like to see more UAPs using OnTyme (or some other electronic message system)?

Yes 8
No 3

Why?

4. For what specific activities have you found OnTyme to be especially useful?

5. If you have to pick up the cost* for you use of OnTyme, will you continue to use it?

Yes 8
No 3

*Usage fees for the ______ id have average______/month over the last six months. (This figure includes usage fees only, it does not include the $100/month charge for the entire UAP account.)

APPENDIX 7:

Publications and Presentations

PUBLICATIONS AND PRESENTATIONS

TELECOMMUNICATIONS AND SERVICE TO THE DEVELOPMENTALLY DISABLED

VOLUME 1: NEEDS AND OPPORTUNITIES
Alternate Media Center (AMC)
April 1979

Summarizes results from project needs assessment, the rationale for demonstrations, and an appraisal of telecommunications options.

VOLUME 2: APPLICATIONS POSSIBILITIES
AMC
May 1979

Discusses ideas for DD telecommunication applications gathered during needs assessment. Glossary. Bibliography.

VOLUME 3: DECISIONS ON DEMONSTRATION PROJECTS
AMC
July 1979

Presents decisions for implementation phase of project.

NATIONAL NETWORKING AMONG UAPs: A PILOT TEST OF ELECTRONIC MAIL
Institute for the Future (IFTF)
November 1979

Summarizes results of pilot test of computer-based message system conducted by the American Assocation of University Affiliated Programs

A MANUAL FOR UAF ON TYME MESSAGE SYSTEM USERS
IFTF
November 1979

A specially prepared user's guide for UAP electronic message system users.

NATIONAL NETWORKING AMONG UAPs: A TELECOMMUNICATIONS DEMONSTRATION
IFTF
January 1980

Outlines plan for UAP national networking demonstration.

MAKING TELECOMMUNICATIONS WORK FOR THE DEVELOPMENTALLY DISABLED: A FIRST REPORT ON THE VERMONT DEMONSTRATIONS
AMC
January 1980

Reviews specific applications under way or planned for Vermont.

CHOOSING AN ELECTRONIC MESSAGE SYSTEM:
A GUIDE FOR THE HUMAN SERVICES

IFTF
September 1980

An introduction to strengths and weaknesses of electronic message systems.

ESTABLISHING A TELEPHONE CONFERENCING SYSTEM:
THE DYNAMICS OF DOING IT

Eileen Connell
September 1980

Summarizes most important factors in establishing a telephone conferencing system.

ELECTRONIC MAIL AMONG UNIVERSITY TRAINING CENTERS: A DEMONSTRATION IN NATIONAL NETWORK BUILDING

IFTF
November 1980

Final report of the national networking demonstration.

1981 AUDIO CONFERENCING HANDBOOK

Paul Rowan
January1981

A practical guide for implementing an audio conferencing system.

USER PERSPECTIVES: VERMONTERS TALK ABOUT THE TELECOMMUNICATION DEMONSTRATION

Stephen Chupack
Edward Sbardellati
Karen Thomas
Lee Viets
Gail Wickes
July 1981

Users describe their telecommunication experience in Vermont and the lessons they learned.

YOU CAN SEE THE RESULTS BUT WHAT WENT INTO THE MAKING?

Red Burns
July 1981

An end-of-project review of the Alternate Media Center's approach toward the telecommunication demonstrations in Vermont.

THE EFFECT OF CURRENT ECONOMIC PRESSURES ON THE SCOPE FOR NEW TELECOMMUNICATION SERVICES IN THE FIELD OF DEVELOPMENTAL DISABILITIES

Martin C. J. Elton
July 1981

An assessment of fiscal belt-tightening effects on opportunities for telecommunication services in DD.

NATIONAL NETWORKING: A CASE STUDY The concentrated effort to stabilize the operation of the UAP network for electronic mail, add new users from other sections of the DD community, and extend the use of teleconferencing for training and as an aid for direct services, is described along with guidelines for successful telecommunications applications in health-related agencies and services.	Seldon A. Todd, Jr. Michael Greelis July 1981
NETWORKING MICROCOMPUTERS FOR VOCATIONAL, EDUCATIONAL, AND SOCIAL DEVELOPMENT OF THE DEVELOPMENTALLY DISABLED A description of the personal computer application and its impact.	James Schumacher Fred Abraham Gisela Wilson July 1981
BUILDING A NEW PARTNERSHIP: MICROCOMPUTERS AND THE HANDICAPPED How the personal computer application was designed and organized.	Pat Quarles Red Burns July 1981
TELECOMMUNICATIONS AND DEVELOPMENTALLY DISABLED PEOPLE: EVALUATIONS OF AUDIO CONFERENCING, PERSONAL COMPUTERS, COMPUTER CONFERENCING, AND ELECTRONIC MAIL Final report of project.	Robert Johansen Barbara McNeal Michael J. Nyhan July 1981

The above papers
are available from:

Developmental Disabilities Project
Institute for the Future
2740 Sand Hill Road
Menlo Park, California 94025
415-854-6322

or

Alternate Media Center
School of the Arts
New York University
725 Broadway, 4th Floor
New York, New York 10003
212-598-2852

Slide/Tape

VERMONTERS TALK ABOUT AUDIO CONFERENCING AN OPTION FOR THE '80s

Vermont Telecommunications, Inc.
103 S. Main Street
Waterbury, VT 05676
(802) 241-2929
June 1981

Describes the audio conferencing service available from Vermont Telecommunications, Inc., and how it has been used by developmental disability groups in Vermont.

The slide/tape may be borrowed from the Institute for the Future or the Alternate Media Center.

Videotape

"APPLES"--HOME COMPUTERS AND TELECOMMUNICATIONS IN VERMONT

United Cerebral Palsy
Vermont
May 1981

Shows how personal computers were used in Vermont and how the users adjusted to them.

This 3/4" videotape may be borrowed from the Institute for the Future or the Alternate Media Center.

APPENDIX 8:

Project Advisory Board

Jane Belau
McKnight Foundation

James Budde
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Children's Center
University of Kansas

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North Carolina Department
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Council on the Developmentally
Disabled

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Electronic Systems Lab
GTE Laboratories, Inc.

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Pregnancy & Infancy Branch
National Institute of Child
Health and Human Development

Edward Goldstein
AT&T

Herbert Goldstein
Curriculum Research and
New York University
Mental Retardation

Edmund Gordon
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Minority Education
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Vince Hutchins
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Georgetown University Medical Center

Paul Marchand
National Assocation for Retarded
Citizens

Saralyn Oberdorfer
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Georgina Sumner
Nursing Child Assessment Satellite
Training
University of Washington

Percy Tannenbaum (Chairman)
Graduate School of Public Policy
University of California at Berkeley

George Tarjan
Neuro-Psychiatric Institute
University of California at Los Angeles

Rolf Williams
Developmental Disabilities/Technical
Assistance System
North Carolina

Edward Ziegler
Bush Center in Child Development
and Social Policy
Yale University